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Addendum 2

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**TOLL ENRICHMENT URANIUM HEXAFLUORIDE:
NATURAL AND REACTOR RETURN FEED ANALYSES
AT ORGDP FOR CY 1982,
INCLUDING SUMMARIES FOR CYS 1969-1982**

W. D. Hedge

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TOLL ENRICHMENT URANIUM HEXAFLUORIDE:
NATURAL AND REACTOR RETURN FEED ANALYSES
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INTRODUCTION

The attached tables are summaries of the results of analyses performed at the Oak Ridge Gaseous Diffusion Plant (ORGDP) for defining adherence to Toll Enrichment and program feed specifications* for calendar year (CY) 1982 and includes summaries for CY 1969 through CY 1982. Impurity specification results for CY 1969 through CY 1973 are included herein and for CY 1974 through CY 1980 are included in K/TL/AT-58, Rev. 1. Addendum 1 contains like data for CY 1981. Also included are the results of analyses for metallic impurities, and for comparison, ORGDP product, for CY 1982. Such information can be useful for (1) reviewing vendor specification adherence, (2) specification review studies, and (3) establishing areas requiring special attention.

Sampling and analyses schedules have been revised since the inception of the Toll Enrichment program to reflect changed gaseous diffusion plant operating conditions and vendor experience in complying with specifications. All cylinders of reactor return uranium hexafluoride were sampled and analyzed for full specifications. Cylinders of natural feed were sampled and analyzed prior to October 1979 as follows:

1969 - October 1979

- A. Liquid sampled all cylinders for U and ^{235}U .
- B. Liquid sampled 10% for full specification with a minimum of one cylinder per month per vendor.

Note: 1976 - 1978

Excluded all thin-wall cylinders from sampling program (this only affected Allied).

December 1978 - April 1979

- A. Liquid sampled 20% for U and ^{235}U with a minimum of one cylinder per month. (Thin-wall cylinders were folded into the 80% not sampled.)
- B. Same as above for full specifications.

May 1979 - September 1979

- A and B above were the same for customer-owned cylinders.
- 10% of Allied filled DOE-owned thin-wall cylinders for U, ^{235}U , and full specifications.
- 100% of Kerr-McGee filled DOE-owned thin-wall cylinders for U, ^{235}U , and full specifications.

*Federal Register Notices 32FR 16289-16291, November 29, 1967; 34FR 14039, September 4, 1969; 36FR 4563, March 9, 1971; and 36FR 11877-11878, June 22, 1971.

Since October 1979, the following schedule applies:

	Natural Feed [†]		Other
	Allied Chemical BNFL (United Kingdom)	Kerr-McGee Eldorado Comhurex (French)	Depleted, Enriched, Reactor Returns
Sample rate	20%	100%	100%
Analysis required			
Full specification	50%	10%	100%*
Modified specification [‡]	50%	90%	0%

[†] Does not include radiochemical analysis.

[‡] Includes U, ²³⁵U, TmV, Mo, and Cr.

* Depends on the past history of enriched feeds.

The analysis schedule for reactor return feed per vendor was changed in July 1982 to analyzing each sample for U, ²³²U, ²³³U, ²³⁴U, ²³⁵U, ²³⁶U, TmV, and Mo; one of each 10 samples or one per month when available for B, Si, and hydrocarbons; and a composite of ten samples or of available samples received if less than 10 for the remaining specification analyses. The latter composition is accomplished using weighted portions of solutions generated per Table 1.

Table 1 is a subsample flow diagram representing the number of samples obtained from the liquid UF₆ contained in any one sample cylinder. The table represents full specification analyses which are obtained on all feed material other than natural feed. Natural feed UF₆ is analyzed for all specifications indicated in Table 1 except the radiochemical measurements and minor uranium isotopes. Modified specifications for Cr and Mo are performed on subsamples from natural feed obtained in a single fluorothene tube.

Table 2 is a summary of the feed specifications. Included are the sample property analyzed, the specification level, units of results and the basis for the units, the analytical TECHMS procedure number, and a general description of the method.

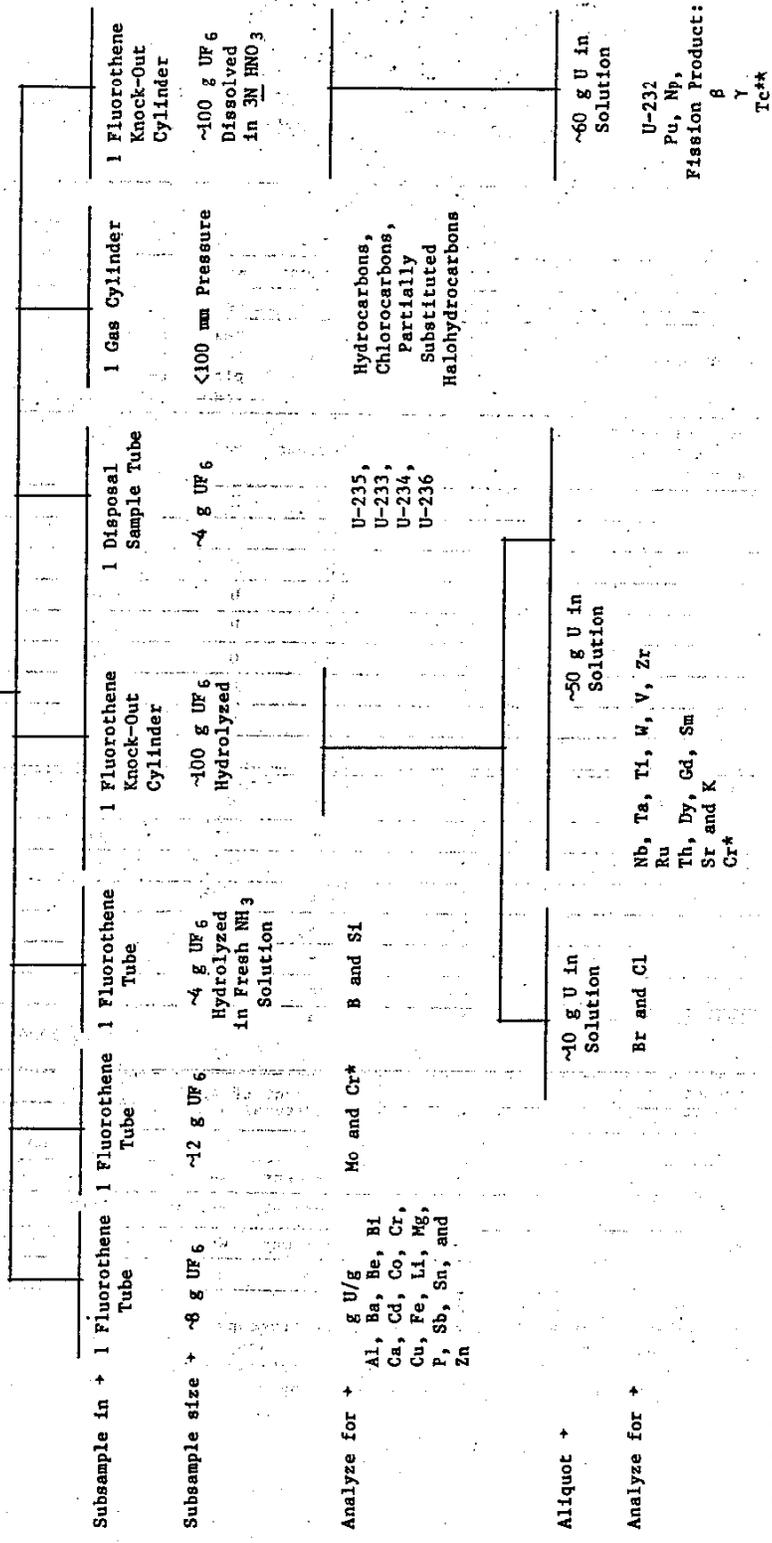
Table 3 is a tabulation of the number of cylinders received from each natural and reactor return vendor for CYs 1969-1982.

The average purity and ²³⁵U of the UF₆ for natural and reactor return feed by individual vendor by month are given in Table 4 for CY 1982. Included in the table are the total number of cylinders analyzed by ORGDP from each vendor.

Table 5 is a tabulation of those results observed out-of-specification for the periods CYs 1969-1975, CYs 1976-1982, and CY 1982.

Table 1. Toll Enrichment Feed Specification Subsample Flow

25 Cylinder Sample
From Shipping Cylinder



*The Cr for modified specification is for natural feed only; otherwise, Cr is obtained from hydrolyzed UF₆ solution.
 **Although Tc is not a specific specification, radiochemical results are obtained for operational purposes.

Table 2. Toll Enrichment feed specifications including procedure numbers and methods

Property	Specification Limits		Unit	Basis	Procedure Number(1)	Method Description(2)
	Minimum	Maximum				
Uranium Hexafluoride	99.5		Percent	Weight	-	Calculation
Uranium	-		Percent	Weight	1800	Gravimetric
Cylinder vapor pressure at 200°F		75	psia	Measured on shipping cylinder	-	TEMP: Thermocouple PRES: Transmitter
Hydrocarbons, chlorocarbons, partially substituted halohydrocarbons	0.01		Percent	mole	2106	Gas MS
Antimony	1		ppm	U	1001	CD/ES
Bromine	5		ppm	U	1808	Polarographic
Chlorine	100		ppm	U	1802	Colorimetric
Niobium	1		ppm	U	1009	CUP/ES
Phosphorus	50		ppm	U	1001	CD/ES
Ruthenium	1		ppm	U	1014	ZR/ES
Silicon	100		ppm	U	1006	CD/ES
Tantalum	1		ppm	U	1009	CUP/ES
Titanium	1		ppm	U	1009	CUP/ES
Elements forming nonvolatile fluorides	300		ppm	U	1042	CD/ES
Chromium	1500		ppm	²³⁵ U	1005	Atomic Absorption
Molybdenum	200		ppm	²³⁵ U	1824	Colorimetric
Tungsten	200		ppm	²³⁵ U	1009	CUP/ES
Vanadium	200		ppm	²³⁵ U	1009	CUP/ES
Uranium-233	500		ppm	²³⁵ U	2113	Thermal Ionization MS
Uranium-232	0.110		ppm	²³⁵ U	1609	Radiochemical
Boron equivalent cross section	8		ppm	U	2006 1013/1006	Calculation Dy, Gd, Sm, Th: FP/ES B: CD/ES
Fission product gamma	20		Percent of Aged Natural U		1608	Radiochemical
Fission product beta	10				1608	Radiochemical
Transuranic alpha	1500		d/m/g	U	1606/1607	Np/Pu Radiochemical
Uranium-234	-		Percent	Weight	2114	Thermal Ionization MS
Uranium-235	0.7103		Percent	Weight	2118	Relative UF ₆ Gas MS
Uranium-236	-		Percent	Weight	2114	Thermal Ionization MS
Technetium	-		ppm	U	1610	Radiochemical

(1) TECHMS Analytical Procedure Numbers

(2) CUP/ES: Cupferron Extraction and Emission Spectroscopy
 CD/ES: Carrier Distillation and Emission Spectroscopy
 FP/ES: Fluoride Precipitation and Emission Spectroscopy
 ZR/ES: Zinc Reduction and Emission Spectroscopy
 MS: Mass Spectrometry

Table 3. Fourteen-year summary of feed cylinders received

Vendor	Type*	Calendar Year														
		1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	
Cylinders Received†																
Belgian (Euro-Chem)	RR	0	2	0	0	0	0	0	0	0	0	5	0	0	0	0
British (BNFL)	N	51	92	11	64	49	29	70	92	66	39	9	13	7	39	0
British (BNFL)	RR	0	2	0	2	7	15	14	9	13	4	0	0	0	0	0
Canadian (Eldorado Nuclear)	N	0	6	23	49	70	88	95	78	35	62	23	83	97	101	0
French (Comhurex)	N	4	23	22	22	55	99	124	165	71	134	16	62	45	40	0
French (Cogema)	RR	10	10	0	17	28	16	0	3	0	12	11	28	53	8	0
German	RR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Russian	RR	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
USA (Allied Chemical)	N	197	388	111	57	136	175	216	193	105	133	34	28	30	272	0
USA (Kerr-McGee)	N	0	40	56	141	214	106	58	64	288	124	105	154	190	207	0
Totals																
Natural Feed		252	549	223	333	524	497	563	592	565	492	187	340	369	659	0
Reactor Return		10	14	0	19	35	31	14	12	18	16	13	31	53	8	0
All		262	563	223	352	559	528	577	604	583	508	200	371	422	667	0

*Type of feed cylinders are reactor return (RR) or natural (N).

†W. D. Hedge, R. F. Smith, and F. S. Voss, Cascade Complex Inventory Difference (ID) Study Committee: Analytical Measurements Subcommittee, Part 3: Natural Feed (1969-1981), (K/TL/AT-73, Part 3). Union Carbide Corporation, Nuclear Division, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, July 1982.

Table 4. Summary of uranium and uranium-235 by month and vendor for CY 1982

Month	Allied Chemical		British (BNFL)		Eldorado Nuclear		French (Comhurex)		Kerr-McGee		Composite			
	No. of Analyses	% U ²³⁵	No. of Analyses	% U ²³⁵	No. of Analyses	% U ²³⁵	No. of Analyses	% U ²³⁵	No. of Analyses	% U ²³⁵	No. of Analyses	% U ²³⁵		
January	6	99.950	2	99.971	17	99.934	0	99.979	21	99.961	30	99.960		
February	6	99.976	1	99.980	9	99.957	0	99.973	13	99.973	29	99.964		
March	6	99.968	2	99.934	11	99.959	4	99.952	22	99.973	43	99.967		
April	7	99.979	0	—	5	99.975	0	—	28	99.975	39	99.974		
May	7	99.979	1	99.996	7	99.978	0	—	9	99.987	26	99.982		
June	2	99.986	0	—	13	99.977	0	—	19	99.987	34	99.983		
July	2	99.972	1	100	2	99.980	0	—	12	99.991	33	99.985		
August	2	99.966	2	99.988	2	99.980	17	99.981	12	99.991	28	99.985		
September	3	99.950	1	99.998	4	99.980	9	99.984	11	99.990	20	99.966		
October	5	99.965	0	—	5	99.943	0	—	11	99.978	38	99.972		
November	2	99.976	0	—	12	99.967	0	—	19	99.974	41	99.967		
December	5	99.950	0	—	1	99.991	0	—	20	99.966	33	99.967		
CT 1982	43	99.966	10	99.980	84	99.966	36	99.974	221	99.975	394	99.972		
Reactor Returns														
French (Cogema)	No. of Analyses	January	February	March	April	May	June	July	August	September	October	November	December	CY 1982
% U ²³⁵	0	10	0	0	0	0	0	9	6	0	0	4	0	29
% U ²³⁵	—	99.961	—	—	—	—	—	99.969	99.959	—	—	99.970	—	99.964
% U ²³⁵	—	1.0836	—	—	—	—	—	0.96191	2.4611	—	—	0.93887	—	1.311

Table 5. Summary of out-of-specification results for CYs 1969-1982

	Cylinders with UF ₆ not within specifications											
	1969-1975				1976-1982						1982	
	Cylinder Pressure	Cr	Ti	²³⁵ U	Cylinder Pressure	Cl	Mo	Ti	TiV	²³⁵ U	Cl	Mo
Natural Feed												
Allied Chemical	1	0	0	0	0	0	0	0	0	0	0	0
British (BNFL)	12	0	1	0	0	1	0	0	0	0	0	0
Eldorado Nuclear	2	0	0	0	1	2	44	0	0	0	1	15
French (Comhurex)	5	8	0	8	0	1	0	0	0	4	0	0
Kerr-McGee	2	5	0	5	1	0	3	1	1	1	0	2
Reactor Return Feed	α	β	γ	Mo								
French (Cogema)	6	1	1	3	0	0	4	0	0	0	0	4

SUMMARY

Presented in Table 6 are those specification properties which were observed to be present in Toll Enrichment feed during CY 1982. Both natural and reactor return feed by individual vendor are included, as is also ORGDP product for comparison. Specifications were exceeded by Eldorado for Mo and Cl and by France (Cogema) and Kerr-McGee for Mo.

Presented in Table 7 are the nonvolatile metallic fluorides as determined by carrier distillation/emission spectroscopy (Quantometer) which were observed in natural, reactor return, and in ORGDP product. The common elements observed (Cu, Fe, and Ni) are expected due to UF₆ contact with materials used during shipping, sampling, and sub-sampling.

Table 6. Specification impurities observed in CY 1982(1)

Natural Feed	BEQ(2)	Cl	Cr	Mo	Si	Ti	TNV(3)	W	²³² U	α	β	γ
Allied Chemical	x	x		x	x		x					
British (BNFL)		x		x	x		x					
Eldorado Nuclear	x	(1)		(15)	x	x	x					
French (Comhurex)		x		x	x		x					
Kerr-McGee		x	x	(2)	x	x	x					
[analyses for ²³² U, α, β, and γ are not performed for natural feed]												
Reactor Returns												
French (Cogema)		x		(4)	x		x	x	x	x	x	x
ORGDP Product	x	x		x	x		x				x	x

(1) Numbers in parentheses are the number of results out of specification.

(2) Boron equivalent cross-section (BEQ).

(3) Total nonvolatile fluorides (TNV)

Table 7. Nonvolatile fluorides observed in CY 1982

Natural Feed	Al	Ba	Cd	Ca	Cr	Co	Cu	Fe	Pb	Ni	Si	Na	Zn
Allied Chemical	x	x	x	x	x	x	x	x	x	x	x	x	
British (BNFL)	x	x	x	x	x	x	x	x	x	x	x	x	
Eldorado Nuclear	x	x	x	x	x	x	x	x	x	x	x	x	x
French (Comhurex)	x	x	x	x	x	x	x	x	x	x	x	x	
Kerr-McGee	x	x	x	x	x	x	x	x	x	x	x	x	
Reactor Returns													
French (Cogema)				x	x		x	x	x	x	x	x	
ORGDP Product			x	x	x		x	x		x	x		

Table 8 is a fourteen-year summary of the results of natural feed specification analyses by year and vendor for CYs 1969-1982. The average level of results and the percentage of samples with observed values are indicated in the table. Table 9 is a similar tabulation for reactor return feed. Chlorine is observed in virtually every sample. Mo, nonvolatile fluoride, and Si are observed in most of the samples. Transuranic alpha and ²³²U are observed in most reactor return samples, with ²³²U often approaching specification levels.

Table 8. Fourteen-year summary of natural feed analyses †

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Uranium Hexafluoride*														
Allied Chemical	99.970	99.977	99.978	99.972	99.976	99.978	99.985	99.977	99.984	99.980	99.973	99.955	99.971	99.966
British (BNFL)	99.977	99.978	99.962	99.979	99.974	99.982	99.983	99.983	99.983	99.979	99.967	99.954	99.966	99.980
Eldorado Nuclear	-	99.978	99.973	99.981	99.977	99.980	99.987	99.985	99.982	99.982	99.976	99.955	99.966	99.966
French (Comurex)	99.970	99.977	99.978	99.972	99.976	99.979	99.985	99.977	99.984	99.980	99.973	99.964	99.966	99.974
Kerr-McGee	-	99.981	99.977	99.979	99.977	99.983	99.984	99.983	99.985	99.980	99.972	99.962	99.970	99.975
Uranium-235*														
Allied Chemical	0.71100	0.71088	0.71084	0.71079	0.71090	0.71090	0.71086	0.71093	0.71094	0.71090	0.71070	0.71092	0.71089	0.71087
British (BNFL)	0.71103	0.71093	0.71058	0.71106	0.71093	0.71110	0.71105	0.71114	0.71113	0.71113	0.71108	0.71103	0.71097	0.71101
Eldorado Nuclear	-	0.71108	0.71115	0.71110	0.71113	0.71110	0.71092	0.71097	0.71105	0.71105	0.71101	0.71096	0.71100	0.71105
French (Comurex)	0.71106	0.71109	0.71092	0.71097	0.71093	0.71090	0.71089	0.71092	0.71086	0.71067	0.71070	0.71080	0.71082	0.71081
Kerr-McGee	-	0.71095	0.71092	0.71083	0.71085	0.71080	0.71086	0.71083	0.71087	0.71083	0.71084	0.71083	0.71086	0.71089
Specification Impurities														
Antimony All results for each vendor for each year are <1														
Boron Equivalent Cross-Section														
Allied Chemical	0.1(100)	0.2(100)	0.1(100)	1.8(12)	<1.8	2.0(6)	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	2.1(36)	2.0(6)
British (BNFL)	0.3(100)	0.3(100)	0.2(100)	<1.8	2.5(11)	<1.8	<1.8	<1.8	<1.8	4.0(7)	<1.8	<1.8	2.1(33)	<1.8
Eldorado Nuclear	-	0.2(100)	0.2(100)	<1.8	1.8(8)	<1.8	<1.8	<1.8	5.0(8)	<1.8	<1.8	<1.8	2.6(19)	4.0(8)
French (Comurex)	0.2(100)	0.2(100)	0.1(100)	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	5.0(12)	<1.8	2.0(7)	2.5(50)	<1.8
Kerr-McGee	-	0.3(100)	0.2(100)	<1.8	3.1(5)	<1.8	<1.8	<1.8	<1.8	4.0(5)	<1.8	<1.8	2.8(47)	<1.8
Bromine														
Allied Chemical	1.0(17)	1.4(68)	1.5(17)	<1	<1	<1	<1	<1	<1	1.3(5)	2.5(19)	1.05(12)	<5	<5
British (BNFL)	1.0(10)	1.5(64)	2.0(12)	<1	<1	<1	<1	<1	<1	<1	1.2(20)	<1	<5	<5
Eldorado Nuclear	-	1.0(20)	<1	<1	<1	<1	<1	3.9(8)	<1	<1	1.7(23)	<1	<5	<5
French (Comurex)	<1	1.2(6)	1.0(9)	<1	<1	<1	<1	<1	<1	<1	1.8(33)	1.0(7)	<5	<5
Kerr-McGee	-	1.5(68)	1.2(10)	1.0(6)	<1	1.6(9)	<1	<1	<1	<1	1.6(18)	<1	<5	<5

*Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.
 †H. D. Hedge, R. F. Smith, and F. S. Voss, *Cascade Complex Inventory Differences (ID) Study Committee: Analytical Measurements Subcommittee, Part 3: Natural Feed (1969-1981)*, (K/TL/AT-73, Part 3). Union Carbide Corporation, Nuclear Division, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, July 1982.
 ‡One or more results out of specifications.

Table 8. Fourteen-year summary of natural feed analyses (continued)†

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Chlorine														
Allied Chemical	50(100)	30(100)	32(100)	30(100)	39(100)	39(100)	37(100)	37(100)	42(100)	59(100)	46(100)	53(100)	34(100)	37(100)
British (BNFL)	31(100)	27(100)*	20(100)	27(100)	40(100)	33(100)	37(85)	40(100)	51(100)	56(100)	32(100)	44(100)	39(100)	42(100)
Eldorado Nuclear	-	21(100)	28(100)	32(100)	35(100)	33(100)	37(100)	34(100)	54(100)	62(100)	37(100)	58(100)*	39(100)	44(100)*
French (Comhurex)	26(100)	41(100)	27(100)	29(100)	34(100)	42(100)	39(100)	51(100)	49(100)	56(100)	38(100)	66(100)*	42(100)	38(100)
Kerr-McGee	29(100)	24(100)	23(100)	25(100)	38(100)	36(100)	39(100)	32(100)	50(100)	51(100)	45(100)	49(100)	44(100)	51(100)
Chromium														
Allied Chemical	<280	280(4)	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280
British (BNFL)	<280	560(1)	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280
Eldorado Nuclear	-	560(20)	<280	3000(71)*	<280	<280	<280	<280	<280	<280	<280	<280	<280	<280
French (Comhurex)	700(9)	370(13)	<280	630(22)	2300(36)*	1050(17)	<280	<280	<280	<280	<280	<280	<280	<280
Kerr-McGee	-	630(8)	280(1)	630(22)	2300(36)*	1050(17)	<280	<280	<280	<280	<280	<280	<280	820(0.4)
Cylinder Pressure														
Allied Chemical	56(100)	59(100)*	52(100)	57(100)	61(100)	65(100)	54(100)	54(100)	**	**	**	**	57(100)	**
British (BNFL)	68(100)*	60(100)*	61(100)	69(100)*	60(100)	66(100)	55(100)	55(100)	**	**	**	**	68(100)	**
Eldorado Nuclear	-	65(100)	62(100)*	59(100)*	58(100)	65(100)	60(100)	60(100)	**	**	**	**	59(100)*	**
French (Comhurex)	62(100)	62(100)	80(100)*	63(100)	59(100)	66(100)	54(100)	54(100)	**	**	**	**	61(100)	**
Kerr-McGee	-	58(100)*	57(100)	57(100)	56(100)	65(100)	60(100)	60(100)	**	**	**	**	57(100)*	**
Hydrocarbons, etc.														
All results for each vendor for each year are <0.01														
Molybdenum														
Allied Chemical	29(33)	42(7)	<28	<28	<28	<28	<28	<28	<28	<28	140(5)	65(14)	116(24)	122(19)
British (BNFL)	52(14)	140(1)	73(62)	84(8)	<28	<28	<28	<28	<28	<28	<28	140(8)	168(12)	150(10)
Eldorado Nuclear	-	<28	<28	<28	<28	154(8)	28(10)	56(11)	<28	<28	371(22)*	142(49)*	180(98)*	159(100)*
French (Comhurex)	102(36)	56(50)	77(18)	<28	<28	140(9)	<28	<28	<28	<28	<28	119(29)	114(80)	106(86)
Kerr-McGee	-	58(31)	51(25)	<28	98(5)	29(9)	<28	<28	<28	<28	<28	106(43)	113(61)*	108(86)8

† Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.
 * One or more results greater than specifications.
 **Not measured.

Table 8. Fourteen-year summary of natural feed analyses (continued) †

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Mobium														
Allied Chemical	0.3(17)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
British (BNFL)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Eldorado Nuclear	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
French (Comhurex)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Kerr-McGee	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nonvolatile Fluorides														
Allied Chemical	51(100)	86(100)	36(100)	26(100)	80(100)	36(100)	31(100)	31(100)	43(93)	37(100)	53(100)	52(100)	41(100)	32(93)
British (BNFL)	53(100)	83(100)	52(100)	20(100)	101(100)	24(100)	33(92)	25(90)	44(89)	26(100)	27(100)	36(100)	47(100)	31(90)
Eldorado Nuclear	-	104(100)	48(100)	48(100)	65(100)	42(92)	13(100)	41(100)	39(100)	26(100)	48(100)	40(97)	42(100)	47(89)
French (Comhurex)	80(100)	78(100)	32(100)	26(100)	64(100)	55(100)	14(100)	40(100)	34(100)	27(100)	38(100)	37(100)	28(100)	33(97)
Kerr-McGee	-	74(100)	62(100)	28(100)	57(100)	43(100)	10(100)	38(100)	24(90)	47(95)	48(100)	43(100)	29(99)*	54(91)
Phosphorus														
All results for each vendor for each year are <20														
Ruthenium														
All results for each vendor for each year are <1														
Silicon														
Allied Chemical	10(94)	12(100)	7(100)	10(100)	11(78)	9(100)	6(53)	5(80)	8(27)	5(53)	6(86)	8(94)	7(76)	11(50)
British (BNFL)	8(100)	10(98)	9(100)	9(83)	12(100)	15(78)	13(46)	8(70)	5(44)	4(53)	6(80)	6(75)	6(100)	10(43)
Eldorado Nuclear	-	10(100)	8(73)	7(85)	10(92)	10(92)	12(60)	11(100)	7(58)	6(75)	4(77)	9(93)	7(81)	10(50)
French (Comhurex)	6(73)	11(94)	7(82)	6(100)	7(89)	14(100)	4(45)	10(76)	8(22)	6(75)	6(56)	10(100)	9(10)	10(50)
Kerr-McGee	-	10(88)	7(98)	8(94)	10(100)	9(100)	7(64)	9(67)	7(21)	9(40)	4(76)	8(82)	16(65)	15(54)
Tantalum														
Allied Chemical	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.3
British (BNFL)	<0.5	0.7(2)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.0(20)	<0.5	<0.3	<0.3
Eldorado Nuclear	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.3	<0.3
French (Comhurex)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.3	<0.3
Kerr-McGee	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.3	<0.3

† Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.
 * One or more results greater than specifications.

Table 8. Fourteen-year summary of natural feed analyses (continued)†

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Titanium														
Allied Chemical	0.7(17)	0.7(4)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.6(5)	<0.3	<0.3	<0.3
British (BNFL)	<0.3	0.6(6)*	0.5(50)	0.4(17)	1.0(11)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Eldorado Nuclear	-	<0.3	<0.3	0.6(15)	<0.3	<0.3	0.3(10)	<0.3	<0.3	<0.3	1.0(8)	<0.3	<0.3	0.8(8)
French (Comurax)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.3(5)	<0.3	<0.3	<0.3	0.6(7)	<0.3	<0.3
Kerr-McGee	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	5.0(6)*	<0.3	<0.3	0.6(5)
Tungsten														
Allied Chemical	140(6)	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
British (BNFL)	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Eldorado Nuclear	-	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
French (Comurax)	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Kerr-McGee	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Vanadium														
Allied Chemical	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42
British (BNFL)	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42
Eldorado Nuclear	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42
French (Comurax)	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42
Kerr-McGee	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42	<42

† Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.
* One or more results greater than specifications.

Table 9. Fourteen-year summary of reactor return analyses

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Uranium Hexafluoride														
Belgian (Euro-Chem)		99.978							99.988					
British (BNFL)		99.985		99.965	99.970	99.972	99.984	99.986	99.970	99.960				
French (Cogema)	99.967	99.977		99.972	99.971	99.969		99.990		99.989	99.981	99.964	99.959	99.964
German											99.990			
Russian												99.963		
Uranium-234														
Belgian (Euro-Chem)		0.011							0.011					
British (BNFL)		0.020		0.023	0.014	0.005	0.006	0.005	0.019	0.009				
French (Cogema)	0.010	0.013		0.011	0.015	0.013		0.017		0.013	0.007	0.013	0.014	0.016
German											0.018			
Russian												0.021		
Uranium-235														
Belgian (Euro-Chem)		0.9583							1.0527					
British (BNFL)		1.805		1.917	1.375	0.6423	0.8390	0.6420	2.064	1.062				
French (Cogema)	1.623	1.767		1.518	1.977	1.507		2.017		1.046	1.029	1.070	1.013	1.311
German											2.015			
Russian												2.678		
Uranium-236														
Belgian (Euro-Chem)		0.185							0.029					
British (BNFL)		0.050		0.071	0.045	0.011	0.012	0.011	0.057	0.051				
French (Cogema)	0.039	0.232		0.158	0.242	0.176		0.022		0.152	0.024	0.254	0.239	0.24
German											0.028			
Russian												0.016		

Table 9. Fourteen-year summary of reactor return analyses (continued) †

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Uranium-232														
Belgian (Euro-Chem)	-	0.030(100)	-	-	-	-	-	-	-	-	-	-	-	-
British (BNFL)	-	<0.010	-	0.004(100)	0.004(100)	<0.01	<0.03	<0.05	0.041(100)	<0.01	-	-	-	-
French (Cogema)	0.025(40)	0.069(100)	-	0.018(82)	0.024(96)	0.032(62)	-	<0.05	<0.02	0.022(75)	0.002(18)	0.037(85)	0.050(89)	0.055(62)
German	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-
Uranium-233														
Belgian (Euro-Chem)	-	<42	-	-	-	-	-	-	-	-	-	<0.01	-	-
British (BNFL)	-	<280	-	<100	<100	<100	<100	<100	<100	<400	<400	<400	<500	<400
French (Cogema)	<100	86(90)	-	140(6)	<100	<100	<100	<100	<100	<300	<400	<400	<400	<400
German	-	-	-	-	-	-	-	-	-	-	<100	<400	-	-
Russian	-	-	-	-	-	-	-	-	-	-	<100	<400	-	-
Specification Impurities														
Antimony ¹⁰⁹ Sb ¹²⁵ Sb All results for each vendor for each year are <1.8														
Boron Equivalent Cross-Section														
Belgian (Euro-Chem)	-	0.03(100)	-	-	-	-	-	-	-	-	-	-	-	-
British (BNFL)	-	0.59(100)	-	<1.8	2.7(29)	3.6(13)	2.0(14)	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
French (Cogema)	0.46(100)	0.14(100)	-	<1.8	2.0(4)	<1.8	<1.8	<1.8	<1.8	5.5(8)	<1.8	<1.8	3.8(25)	<1.8
German	-	-	-	-	-	-	-	-	-	-	3.5(50)	<1.8	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	<1.8	-	-
Bromine														
Belgian (Euro-Chem)	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
British (BNFL)	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
French (Cogema)	1.0(90)	1.3(50)	-	<1	<1	<1	<1	<1	<1	<1	<1	2.0(4)	<5	<5
German	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1
Russian	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<1

†Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.

Table 9. Fourteen-year summary of reactor return analyses (continued) †

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Chlorine														
Belgian (Euro-Chem)	-	22(100)	-	38(100)	46(100)	33(100)	37(100)	54(100)	55(100)	-	-	-	-	-
British (BNFL)	-	18(100)	-	29(100)	35(100)	35(100)	-	59(100)	63(100)	50(100)	50(100)	55(100)	32(100)	27(100)
French (Cogema)	46(100)	55(100)	-	-	-	-	-	-	-	-	47(100)	-	-	-
German	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	41(100)	-	-
Chromium														
Belgian (Euro-Chem)	-	<210	-	<260	<420	<780	<780	<800	<500	<700	-	-	-	-
British (BNFL)	-	<110	-	<700	598(32)	362(12)	<250	<250	<450	<750	<710	<620	<630	<600
French (Cogema)	150(10)	376(30)	-	-	-	-	-	-	-	-	<248	-	-	-
German	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	<185	-	-
Cylinder Pressure														
Belgian (Euro-Chem)	-	50(100)	-	57(100)	57(100)	66(100)	**	**	**	**	-	-	-	-
British (BNFL)	-	58(100)	-	60(100)	52(100)	65(100)	**	**	**	**	**	**	58(100)	**
French (Cogema)	60(100)	57(100)	-	-	-	-	-	-	-	-	-	-	-	-
German	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fission Product Gamma														
Belgian (Euro-Chem)	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
British (BNFL)	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	6.4(50)	6.7(13) <5
French (Cogema)	100(10)*	6.2(90)	-	-	-	-	-	-	-	-	<5	<5	<5	<5
German	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	-	-	-

†Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.
 *One or more results greater than specification.
 **Not measured.

Table 9. Fourteen-year summary of reactor return analyses (continued)†

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Mission Product Beta														
Belgian (Euro-Chem)		<2												
British (BNFL)		<2	<2											
French (Cogema)	13(10)*	<2												
German														
Russian														
Hydrocarbons, etc.														
Molybdenum														
Belgian (Euro-Chem)		<21												
British (BNFL)		<11												
French (Cogema)	148(100)*	17(30)												
German														
Russian														
Niobium														
Nonvolatile Fluorides														
Belgian (Euro-Chem)		30(100)												
British (BNFL)		40(100)												
French (Cogema)	44(100)	58(100)												
German														
Russian														
Phosphorus														
Ruthenium														

All results for each vendor for each year are <0.1.
 All results for each vendor for each year are <0.2.
 All results from each vendor for each year are <20.
 All results from each vendor for each year are <1.

†Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.
 *One or more results greater than specification.

Table 9. Fourteen-year summary of reactor return analyses (continued)[†]

Property	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Silicon														
Belgian (Euro-Chem)	-	3.5(100)	-	-	-	-	-	-	6(20)	-	-	-	-	-
British (BNFL)	-	14(100)	-	9.5(100)	5.5(86)	6.4(75)	8.1(64)	12(100)	3.0(15)	38(100)	-	-	-	-
French (Cogema)	7.8(100)	5.1(100)	-	9.9(100)	5.0(89)	13(100)	-	3.7(100)	-	111(58)	5.4(64)	7.0(89)	9.4(91)	4.0(43)
German	-	-	-	-	-	-	-	-	-	-	12(8)	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	7.7(100)	-	-
Tantalum	All results from each vendor for each year are below detection limit and specifications.													
Titanium														
Belgian (Euro-Chem)	-	<0.3	-	-	-	-	-	-	<0.3	-	-	-	-	-
British (BNFL)	-	<0.3	-	<0.3	<0.3	<0.3	<0.2	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
French (Cogema)	0.4(70)	0.3(20)	-	<0.3	0.65(21)	<0.3	-	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3
German	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	<0.3	-	-
Transuranic Alpha														
Belgian (Euro-Chem)	-	134(100)	-	-	-	-	-	-	44(40)	-	-	-	-	-
British (BNFL)	-	186(100)	-	386(100)	140(86)	170(60)	42(43)	<25	<25	5(25)	-	-	-	-
French (Cogema)	<150	1323(100)*	-	180(94)	748(96)*	250(100)	-	<10	-	30(58)	18(45)	42(100)	6.3(83)	6.1(57)
German	-	-	-	-	-	-	-	-	-	-	<5	-	-	-
Russian	-	-	-	-	-	-	-	-	-	-	-	<5	-	-
Tungsten	All results from each vendor for each year are below detection limit and specifications.													
Vanadium	All results from each vendor for each year are below detection limit and specifications.													

[†] Numbers in parentheses are the percentage of samples analyzed with results above detectable limits.
 *One or more results greater than specification.

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VII. ADMINISTRATION AND FINANCE

SPECIFICATION ANALYSES

The following tables provide information concerning the required measurements, specification levels, units and basis of results, the number of samples analyzed, the arithmetic average of observed results (less than values are excluded from averages), the range of results, and the number of results exceeding specification for each measurement.

The following is a list of included tables for CY 1982. Similar tables are listed in the appendix for CYs 1969-1973.

<u>Table Number</u>	<u>Material Source</u>
<u>Natural Feed</u>	
10	Allied Chemical (USA)
11	BNFL (British)
12	Comhurex (French)
13	Eldorado Nuclear (Canadian)
14	Kerr-McGee (USA)
<u>Reactor Return Feed</u>	
15	Cogema (French)
<u>ORGDP Product</u>	
16	ORGDP (USA)

Table 10. Specification Analyses for Allied Chemical Natural Feed, CY 1982

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	18	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	18(1)	2.0	<1.8-2.0	0
Bromine	5	ppm	U	18	<5	All <5	0
Chlorine	100	ppm	U	18	36.8	18-83	0
Chromium	1500	ppm	²³⁵ U	43	<700	All <700	0
Cylinder Pressure	75	PSIA	At 200° F	18	(4)	(4)	0
Hydrocarbons, etc.	0.01	Percent	Mole	18	<0.01	All <0.01	0
Molybdenum	200	ppm	²³⁵ U	43(8)	122	<70-180	0
Niobium	1	ppm	U	18	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	43(40)	31.5	0-150	0
Phosphorus	50	ppm	U	18	<20	All <20	0
Ruthenium	1	ppm	U	18	<1	All <1	0
Silicon	100	ppm	U	18(9)	11.1	<2-26	0
Tantalum	1	ppm	U	18	<0.3	All <0.3	0
Titanium	1	ppm	U	18	<0.3	All <0.3	0
Tungsten	200	ppm	²³⁵ U	18	<70	All <70	0
Uranium	(3)	Percent	Weight	43	67.595	67.52-67.62	0
Uranium Hexafluoride	99.5	Percent	Weight	43	99.966	99.86-100	0
Uranium-235	0.7103	Percent	Weight	43	0.71087	0.7106-0.7111	0
Vanadium	200	ppm	²³⁵ U	18	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

(4) Not reported.

Table 11. Specification Analyses for BNFL (British) Natural Feed, CY 1982

Measurement	Specification Level (1)	Feed	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1		ppm	U	7	<1	All <1	0
Boron Equivalent Cross Section	8		ppm	U	7	<1.8	All <1.8	0
Bromine	5		ppm	U	7	<5	All <5	0
Chlorine	100		ppm	U	7	42.4	32-56	0
Chromium	1500		ppm	235U	10	<700	All <700	0
Cylinder Pressure	75		PSIA	At 200°F	7	(4)	(4)	-
Hydrocarbons, etc.	0.01		Percent	Mole	7	<0.01	All <0.01	0
Molybdenum	200		ppm	235U	10(1)	150	<70-150	0
Niobium	1		ppm	U	7	<0.2	All <0.2	0
Nonvolatile Fluorides	300		ppm	U	10(9)	31.2	0-118	0
Phosphorus	50		ppm	U	7	<40	All <40	0
Ruthenium	1		ppm	U	7	<1	All <1	0
Silicon	100		ppm	U	7(3)	9.7	<2-13	0
Tantalum	1		ppm	U	7	<0.3	All <0.3	0
Titanium	1		ppm	U	7	<0.3	All <0.3	0
Tungsten	200		ppm	235U	7	<70	All <70	0
Uranium	(3)		Percent	Weight	10	67.604	67.58-67.62	-
Uranium Hexafluoride	99.5		Percent	Weight	10	99.980	99.94-100	0
Uranium-235	0.7103		Percent	Weight	10	0.71104	0.7110-0.7112	0
Vanadium	200		ppm	235U	7	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

(4) Not reported.

Table 12. Specification Analyses for Comhurex (French) Natural Feed, CY 1982

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	6	<1	All <1	0
Boron, Equivalent Cross Section	8	ppm	U	6	<1.8	All <1.8	0
Bromine	5	ppm	U	6	<5	All <5	0
Chlorine	100	ppm	U	6	37.8	25-48	0
Chromium	1500	ppm	235U	36	<700	All <700	0
Cylinder Pressure	75	PSIA	At 200°F	6	(4)	(4)	-
Hydrocarbons, etc.	0.01	Percent	Mole	6	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	36(31)	106	<70-140	0
Niobium	1	ppm	U	6	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	36(35)	32.7	0-87	0
Phosphorus	50	ppm	U	6	<20	All <20	0
Ruthenium	1	ppm	U	6	<1	All <1	0
Silicon	100	ppm	U	6(3)	10.3	<2-20	0
Tantalum	1	ppm	U	6	<0.3	All <0.3	0
Titanium	1	ppm	U	6	<0.3	All <0.3	0
Tungsten	200	ppm	235U	6	<70	All <70	0
Uranium	(3)	Percent	Weight	36	67.600	67.56-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	36	99.974	99.91-100	0
Uranium-235	0.7103	Percent	Weight	36	0.71081	0.7104-0.7111	0
Vanadium	200	ppm	235U	6	<42	All <42	0

(1) All levels are maximums except UF₆ and 235U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

(4) Not reported.

Table 13. Specification Analyses for Eldorado Nuclear Natural Feed, CY 1982

Measurement	Specification Level(1)	Units	Basis	Number of Samples(2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	12	<1.0	All <1.0	0
Boron Equivalent Cross Section	8	ppm	U	12(1)	4	<1.8-4	0
Bromine	5	ppm	U	12	<5	All <5	0
Chlorine	100	ppm	U	12	44.2	20-110	1
Chromium	1500	ppm	235U	84	<700	All <700	0
Cylinder Pressure	75	PSIA	At 200°F	84	(4)	(4)	-
Hydrocarbons, etc.	0.01	Percent	Mole	12	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	84	159	70-390	15
Niobium	1	ppm	U	12	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	84(75)	46.7	0-135	0
Phosphorus	50	ppm	U	12	<40	All <40	0
Ruthenium	1	ppm	U	12	<1.0	All <1.0	0
Silicon	100	ppm	U	12(6)	10.5	<2-26	0
Tantalum	1	ppm	U	12	<0.3	All <0.3	0
Titanium	1	ppm	U	12(1)	0.8	<0.3-0.8	0
Tungsten	200	ppm	235U	12	<70	All <70	0
Uranium	(3)	Percent Weight	Weight	84	67.595	67.55-67.63	-
Uranium Hexafluoride	99.5	Percent Weight	Weight	84	99.966	99.90-100	0
Uranium-235	0.7103	Percent Weight	Weight	84	0.71105	0.7107-0.7112	0
Vanadium	200	ppm	235U	12	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

(4) Not reported.

Table 14. Specification Analyses for Kerr-McGee Natural Feed, CY 1982

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	100	ppm	U 100F	22	<1.899	All <1.899	0
Boron Equivalent Cross Section	3.8	ppm	U 100F	22	<1.82	All <1.82	0
Bromine	505	ppm	U 235U	22	<5	All <5	0
Chlorine	100	ppm	U 235U	22	50.9	21-100	0
Chromium	1500	ppm	U 235U	22	820	<700-820	0
Cylinder Pressure	1075	PSIA	At 200°F	221(1)	(4)	(4)	0
Hydrocarbons, etc.	0.01	Percent	Mole	221	<0.01	All <0.01	0
Molybdenum	200	ppm	U 235U	221(189)	108	<70-240	2
Niobium	300	ppm	U	22	<0.2	All <0.2	0
Nonvolatile Fluorides	3050	ppm	U	221(202)	54.5	0-170	0
Phosphorus	100	ppm	U 235U	22	<40	All <40	0
Ruthenium	100	ppm	U	22	<10	All <10	0
Silicon	100	ppm	U	22(12)	14.9	<2-32	0
Tantalum	100	ppm	U	22	<0.3	All <0.3	0
Titanium	100	ppm	U	22(1)	0.6	<0.3-0.6	0
Tungsten	200	ppm	U 235U	22	<70	All <70	0
Uranium	(3)	Percent	Weight	221	67.601	67.56-67.63	-
Uranium Hexafluoride	99.5	Percent	Weight	221	99.975	99.91-100	0
Uranium-235	0.7103	Percent	Weight	221	0.71089	0.7106-0.7112	0
Vanadium	200	ppm	U 235U	22	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.
 (2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.
 (3) Not a specific specification.
 (4) Not reported.

Table 15. Specification Analyses for Cogema (French) Reactor Returns, CY 1982

Measurement	Specification Level (1)	Feed	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony (3)	1	ppm	U		14	<1	All <1	0
Boron Equivalent Cross Section (4)	8	ppm	U		14	<1.8	All <1.8	0
Bromine (3)	5	ppm	U		14	<5	All <5	0
Chlorine (3)	100	ppm	U		14	26.8	9-43	0
Chromium (3)	1500	ppm	235U		14	<600	All <600	0
Cylinder Pressure	75	PSIA	At 200°F		29	(5)	(5)	0
Fission Product Gamma (3)	20	Percent of Aged			14	<5	All <5	0
Fission Product Beta (3)	10	Natural U			14(11)	0.73	<0.1-1.2	0
Hydrocarbons, etc. (4)	0.01	Percent Mole			14	<0.01	All <0.01	0
Molybdenum	200	ppm	235U		29(15)	178	<49-250	4
Niobium (3)	1	ppm	U		14	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U		29	46.1	4-185	0
Phosphorus (3)	50	ppm	U		14	<40	All <40	0
Ruthenium (3)	1	ppm	U		14	<1	All <1	0
Silicon (4)	100	ppm	U		14(6)	4.0	<2-10	0
Tantalum (3)	1	ppm	U		14	<0.3	All <0.3	0
Titanium (3)	1	ppm	U		14	<0.3	All <0.3	0
Transuranic Alpha (3)	1500	d/m/g	U		14(8)	6.1	<5-13	0
Tungsten (3)	200	ppm	235U		14(1)	89	<50-89	0
Uranium	(6)	Percent Weight			29	67.589	67.56-67.62	0
Uranium Hexafluoride	99.5	Percent Weight			29	99.964	99.92-100	0
Uranium-232	0.110	ppm	235U		29(18)	0.055	<0.0005-0.079	0
Uranium-233	500	ppm	235U		29	<400	All <400	0
Uranium-234	(6)	Percent Weight			29	0.016	0.008-0.019	0
Uranium-235	(6)	Percent Weight			29	1.311	0.8683-2.487	0
Uranium-236	(6)	Percent Weight			29	0.24	0.015-0.39	0
Vanadium (3)	200	ppm	235U		14	<50	All <50	0

(1) All levels are maximums except UF 6.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

(3) Composite samples.

(4) Single sample representing several samples.

(5) Not reported.

(6) Not a specific specification.

Table 16. Specification Analyses for ORGDP Product, CY 1982

Measurement	Specification Level (1)	Feed	Units	Basis	Number of Samples (2)	Average	Range
Antimony	1	ppm	U		9	<1	All <1
Boron Equivalent Cross Section	8	ppm	U		9(1)	3	<1.8-3.0
Bromine	5	ppm	U		9	<5	All <5
Chlorine	100	ppm	U		9	46.1	29-81
Chromium	1500	ppm	235U		9	<170	All <170
Cylinder Pressure	75	PSIA	PSIA	At 200°F	9	(4)	(4)
Fission Product Gamma	20	Percent of Aged	Percent of Aged	N ₂	9(2)	8.2	<5-8.5
Fission Product Beta	10	Percent	Percent	Natural U	9(7)	0.91	<0.1-4.0
Hydrocarbons, etc.	0.01	Percent Mole	Percent Mole	235U	9	<0.01	All <0.01
Molybdenum	200	ppm	U		9(8)	56.8	<42-120
Niobium	100	ppm	U		9	<0.2	All <0.2
Nonvolatile Fluorides	300	ppm	U		9	29.9	2-67
Phosphorus	50	ppm	U		9	<20	All <20
Ruthenium	20	ppm	U		9	<1	All <1
Silicon	100	ppm	U		9(6)	12	<2-25
Tantalum	1	ppm	U		9	<0.3	All <0.3
Titanium	1	ppm	U		9	<0.3	All <0.3
Transuranic Alpha	1500	d/m/g	U		9(5)	9.7	<5.2-24
Tungsten	200	ppm	235U		9	<17	All <17
Uranium	(3)	Percent Weight	Percent Weight		9	67.598	67.57-67.61
Uranium Hexafluoride	99.5	Percent Weight	Percent Weight		9	99.977	99.94-100
Uranium-232	0.110	ppm	235U		9	<0.005	All <0.005
Uranium-233	500	ppm	235U		9	<300	All <300
Uranium-234	(3)	Percent Weight	Percent Weight		9	0.025	0.019-0.031
Uranium-235	(3)	Percent Weight	Percent Weight		9	2.969	2.408-3.607
Uranium-236	(3)	Percent Weight	Percent Weight		9	0.0079	0.0016-0.031
Vanadium	200	ppm	235U		9	<10	All <10

(1) All levels are maximums except UF₆.
 (2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.
 (3) Not a specific specification.
 (4) Not reported.

SUPPLEMENTAL ANALYSES FOR CY 1982

The following tables provide a summary of results of nonvolatile metallic impurities in natural feed, reactor return feed, and ORGDP product. All results were obtained from carrier distillation/emission spectroscopy (quantometer), except Dy, Gd, Sm, Tc, and Th. The following tables are included:

<u>Table Number</u>	<u>Material Source</u>
<u>Natural Feed</u>	
17	Allied Chemical (USA)
18	BNFL (British)
19	Comhurex (French)
20	Eldorado Nuclear (Canadian)
21	Kerr-McGee (USA)
<u>Reactor Returns</u>	
22	Cogema (French)
<u>ORGDP Product</u>	
23	ORGDP (USA)

The tables include the measured units and basis for results, the number of samples, the arithmetic average (less than values are excluded in averages), and the range of results.

Table 17. Supplemental Analyses for Allied Chemical Natural Feed, CY 1982

Measurement (1)	Units	Basis	Number of Samples (2)	Average	Range
Aluminum	ppm	U	43(1)	2	<2-2
Antimony	ppm	U	43	<5	All <5
Barium	ppm	U	43(1)	1	<1-1
Beryllium	ppm	U	43	<0.2	All <0.2
Bismuth	ppm	U	43	<1	All <1
Boron	ppm	U	43	<0.1	All <0.1
Cadmium	ppm	U	43	<0.1	All <0.1
Calcium	ppm	U	43(4)	3.0	<2-4
Chromium	ppm	U	43(1)	10	<2-10
Cobalt	ppm	U	43(1)	1	<1-1
Copper	ppm	U	43(36)	12.3	<2-50
Iron	ppm	U	43(10)	11.5	<5-20
Lead	ppm	U	43(5)	3.3	<2-5
Lithium	ppm	U	43	<2	All <2
Magnesium	ppm	U	43	<2	All <2
Manganese	ppm	U	43	<2	All <2
Molybdenum	ppm	U	43	<2	All <2
Nickel	ppm	U	43(39)	22.4	<2-80
Phosphorus	ppm	U	43	<40	All <40
Silicon	ppm	U	43(5)	4.2	<2-7
Sodium	ppm	U	43(4)	3.8	<2-5
Tin	ppm	U	43	<2	All <2
Vanadium	ppm	U	43	<2	All <2
Zinc	ppm	U	43	<20	All <20

(1) All analyses by Quantometer spectrochemistry.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

Table 18. Supplemental Analyses for BNFL (British) Natural Feed, CY 1982

Measurement (1)	Units	Basis	Number of Samples (2)	Average	Range
Aluminum	ppm	U	10	<2	A11 <2
Antimony	ppm	U	10	<5	A11 <5
Barium	ppm	U	10	<1	A11 <1
Beryllium	ppm	U	10	<0.2	A11 <0.2
Bismuth	ppm	U	10	<1	A11 <1
Boron	ppm	U	10	<0.1	A11 <0.1
Cadmium	ppm	U	10	<0.1	A11 <0.1
Calcium	ppm	U	10(3)	3.0	<2-4
Chromium	ppm	U	10	<2	A11 <2
Cobalt	ppm	U	10	<1	A11 <1
Copper	ppm	U	10(9)	8.7	<2-15
Iron	ppm	U	10	<5	A11 <5
Lead	ppm	U	10(2)	3.0	<2-3
Lithium	ppm	U	10	<2	A11 <2
Magnesium	ppm	U	10	<2	A11 <2
Manganese	ppm	U	10	<2	A11 <2
Molybdenum	ppm	U	10	<2	A11 <2
Nickel	ppm	U	10(8)	18.5	<2-70
Phosphorus	ppm	U	10	<40	A11 <40
Silicon	ppm	U	10(1)	10	<2-10
Sodium	ppm	U	10	<2	A11 <2
Tin	ppm	U	10	<2	A11 <2
Vanadium	ppm	U	10	<2	A11 <2
Zinc	ppm	U	10(1)	30	<20-30

(1) All analyses by Quantometer spectrochemistry.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

Table 19. Supplemental Analyses for Comhurex (French) Natural Feed, CY 1982

Measurement(1)	Units	Basis	Number of Samples(2)	Average	Range
Aluminum	ppm	U	36	<2	A11 <2
Antimony	ppm	U	36	<5	A11 <5
Barium	ppm	U	36	<1	A11 <1
Beryllium	ppm	U	36	<0.2	A11 <0.2
Bismuth	ppm	U	36	<1	A11 <1
Boron	ppm	U	36	<0.1	A11 <0.1
Cadmium	ppm	U	36	<0.1	A11 <0.1
Calcium	ppm	U	36(1)	4	<2-4
Chromium	ppm	U	36	<2	A11 <2
Cobalt	ppm	U	36	<1	A11 <1
Copper	ppm	U	36(35)	13.0	<2-30
Iron	ppm	U	36(1)	10	<5-10
Lead	ppm	U	36(1)	4	<2-4
Lithium	ppm	U	36	<2	A11 <2
Magnesium	ppm	U	36	<2	A11 <2
Manganese	ppm	U	36	<2	A11 <2
Molybdenum	ppm	U	36	<2	A11 <2
Nickel	ppm	U	36(34)	19.4	<2-50
Phosphorus	ppm	U	36	<40	A11 <40
Silicon	ppm	U	36	<2	A11 <2
Sodium	ppm	U	36(1)	10	<2-10
Tin	ppm	U	36	<2	A11 <2
Vanadium	ppm	U	36	<2	A11 <2
Zinc	ppm	U	36	<2	A11 <2

(1) All analyses by Quantometer spectrochemistry.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

Table 20. Supplemental Analyses for Eldorado Nuclear Natural Feed, CY 1982

Measurement (1)	Units	Basis	Number of Samples (2)	Average	Range
Aluminum	ppm	U	84	<2	All <2
Antimony	ppm	U	84	<5	All <5
Barium	ppm	U	84(2)	1.0	<1-1
Beryllium	ppm	U	84	<0.2	All <0.2
Bismuth	ppm	U	84	<1	All <1
Boron	ppm	U	84	<0.1	All <0.1
Cadmium	ppm	U	84	<0.1	All <0.1
Calcium	ppm	U	84(15)	2.9	<2-6
Chromium	ppm	U	84(3)	3.0	<2-4
Cobalt	ppm	U	84(3)	2.0	<2-3
Copper	ppm	U	84(73)	18.1	<2-55
Iron	ppm	U	84(16)	16.1	<5-35
Lead	ppm	U	84(8)	4.4	<2-8
Lithium	ppm	U	84	<2	All <2
Magnesium	ppm	U	84	<2	All <2
Manganese	ppm	U	84	<2	All <2
Molybdenum	ppm	U	84	<2	All <2
Nickel	ppm	U	84(74)	23.5	<2-80
Phosphorus	ppm	U	84	<40	All <40
Silicon	ppm	U	84(5)	11.4	<2-25
Sodium	ppm	U	84(6)	5.0	<2-10
Tin	ppm	U	84	<2	All <2
Vanadium	ppm	U	84	<2	All <2
Zinc	ppm	U	84	<20	All <20

(1) All analyses by Quantometer spectrochemistry.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

Table 21. Supplemental Analyses for Kerr-McGee Natural Feed, CY 1982

Measurement (1)	Units	Basis	Number of Samples (2)	Average	Range
Aluminum	ppm	U	221(2)	2.5	<2-3
Antimony	ppm	U	221	<5	All <5
Barium	ppm	U	221(1)	1	<1-1
Beryllium	ppm	U	221	<0.2	All <0.2
Bismuth	ppm	U	221	<1	All <1
Boron	ppm	U	221	<0.1	All <0.1
Cadmium	ppm	U	221(1)	0.4	<0.1-0.4
Calcium	ppm	U	221(42)	5.6	<2-15
Chromium	ppm	U	221(14)	4.3	<2-10
Cobalt	ppm	U	221(5)	2.2	<2-3
Copper	ppm	U	221(197)	16.4	<2-90
Iron	ppm	U	221(20)	9.0	<5-20
Lead	ppm	U	221(12)	3.0	<2-5
Lithium	ppm	U	221	<2	All <2
Magnesium	ppm	U	221	<2	All <2
Manganese	ppm	U	221	<2	All <2
Molybdenum	ppm	U	221	<2	All <2
Nickel	ppm	U	221(193)	23.4	<2-90
Phosphorus	ppm	U	221	<40	All <40
Silicon	ppm	U	221(8)	4.1	<2-9
Sodium	ppm	U	221(9)	3.1	<2-3
Tin	ppm	U	221	<2	All <2
Vanadium	ppm	U	221	<2	All <2
Zinc	ppm	U	221	<20	All <20

(1) All analyses by Quantometer spectrochemistry.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

Table 22. Supplemental Analyses for Cogema (French) Reactor Returns, CY 1982

Measurement (1)	Units	Basis	Number of Samples (2)	Average	Range
Aluminum	ppm	U	29	<2	All <2
Antimony	ppm	U	29	<5	All <5
Barium	ppm	U	29	<1	All <1
Beryllium	ppm	U	29	<0.2	All <0.2
Bismuth	ppm	U	29	<1	All <1
Boron	ppm	U	29	<0.1	All <0.2
Cadmium	ppm	U	29	<0.1	All <0.1
Calcium	ppm	U	29(1)	2	<2-2
Chromium	ppm	U	29(8)	3.1	<2-7
Cobalt	ppm	U	29	<2	All <2
Copper	ppm	U	29	16.2	3-76
Dysprosium	ppm	U	29	<0.2	All <0.2
Gadolinium	ppm	U	29	<0.2	All <0.2
Iron	ppm	U	29(9)	22.4	<5-100
Lead	ppm	U	29(6)	3.2	<2-4
Lithium	ppm	U	29	<2	All <2
Magnesium	ppm	U	29	<2	All <2
Manganese	ppm	U	29	<2	All <2
Molybdenum	ppm	U	29	<2	All <2
Nickel	ppm	U	29	23.2	3-70
Phosphorus	ppm	U	29	<40	All <40
Samarium	ppm	U	29	<0.4	All <0.4
Silicon	ppm	U	29(1)	6	<2-6
Sodium	ppm	U	29(1)	10	<2-10
Technetium	ppm	U	29(25)	0.041	<0.005-0.10
Thorium	ppm	U	29	<1	All <1
Tin	ppm	U	29	<2	All <2
Vanadium	ppm	U	29	<2	All <2
Zinc	ppm	U	29	<20	All <20

(1) All analyses by Quantometer spectrochemistry, except Dy, Gd, Sm, Tc, and Th.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

Table 23. Supplemental Analyses for ORGDP Product, CY 1982

Measurement (1)	Units	Basis	Number of Samples (2)	Average	Range
Aluminum	ppm	U	9	<2	A11 <2
Antimony	ppm	U	9	<5	A11 <5
Barium	ppm	U	9	<1	A11 <1
Beryllium	ppm	U	9	<0.2	A11 <0.2
Bismuth	ppm	U	9	<1	A11 <1
Boron	ppm	U	9	<0.1	A11 <0.1
Cadmium	ppm	U	9(3)	0.12	<0.1-0.14
Calcium	ppm	U	9(4)	2	<2-2
Chromium	ppm	U	9(1)	3	<2-3
Cobalt	ppm	U	9	<1	A11 <1
Copper	ppm	U	9(8)	14	7-25
Dysprosium	ppm	U	9	<0.2	A11 <0.2
Gadolinium	ppm	U	9	<0.2	A11 <0.2
Iron	ppm	U	9(2)	5.5	<5-6
Lead	ppm	U	9	<2	A11 <2
Lithium	ppm	U	9	<2	A11 <2
Magnesium	ppm	U	9	<2	A11 <2
Manganese	ppm	U	9	<2	A11 <2
Molybdenum	ppm	U	9	<2	A11 <2
Nickel	ppm	U	9	10.6	2-35
Phosphorus	ppm	U	9	<40	A11 <40
Samarium	ppm	U	9	<0.4	A11 <0.4
Silicon	ppm	U	9(1)	2	<2-2
Sodium	ppm	U	9	<2	A11 <2
Technetium	ppm	U	9	0.036	0.009-0.130
Thorium	ppm	U	9	<1	A11 <1
Tin	ppm	U	9	<2	A11 <2
Vanadium	ppm	U	9	<2	A11 <2
Zinc	ppm	U	9	<20	A11 <20

(1) All analyses by Quantometer spectrochemistry, except Dy, Gd, Sm, Tc, and Th.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results used in averages, i.e., "less than" results are excluded.

APPENDIX

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APPENDIX

The following tables for specification analyses results are provided in this appendix.

<u>Table Number</u>	<u>Calendar Year</u>	<u>Material Source</u>
<u>Natural Feed</u>		
A-1	1969	Allied Chemical (USA)
A-2	1970	Allied Chemical (USA)
A-3	1971	Allied Chemical (USA)
A-4	1972	Allied Chemical (USA)
A-5	1973	Allied Chemical (USA)
A-6	1969	BNFL (British)
A-7	1970	BNFL (British)
A-8	1971	BNFL (British)
A-9	1972	BNFL (British)
A-10	1973	BNFL (British)
A-11	1969	Comhurex (French)
A-12	1970	Comhurex (French)
A-13	1971	Comhurex (French)
A-14	1972	Comhurex (French)
A-15	1973	Comhurex (French)
A-16	1970	Eldorado Nuclear (Canadian)
A-17	1971	Eldorado Nuclear (Canadian)
A-18	1972	Eldorado Nuclear (Canadian)
A-19	1973	Eldorado Nuclear (Canadian)
A-20	1970	Kerr-McGee (USA)
A-21	1971	Kerr-McGee (USA)
A-22	1972	Kerr-McGee (USA)
A-23	1973	Kerr-McGee (USA)
<u>Reactor Return Feed</u>		
A-24	1970	BNFL (British)
A-25	1972	BNFL (British)
A-26	1973	BNFL (British)
A-27	1969	Cogema (French)
A-28	1970	Cogema (French)
A-29	1972	Cogema (French)
A-30	1973	Cogema (French)
A-31	1970	Euro-Chem (Belgian)

Table A-1. Specification Analyses for Allied Chemical Natural Feed, CY 1969

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	18	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	18	0.21	0.01-1.81	0
Bromine	5	ppm	U	18(3)	1	<1-1	0
Chlorine	100	ppm	U	18	50	14-95	0
Chromium	1500	ppm	235U	18	<280	All <280	0
Cylinder Pressure	75	PSIA	At 200°F	18(13)	55.6	50.7-61.7	0
Hydrocarbons, etc.	0.01	Percent	Moie.	18	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	18(6)	29	<28-42	0
Niobium	1	ppm	U	18(3)	0.3	<0.2-0.4	0
Nonvolatile Fluorides	300	ppm	U	18	50.8	10-139	0
Phosphorus	50	ppm	U	18	<20	All <20	0
Ruthenium	1	ppm	U	18	<1	All <1	0
Silicon	100	ppm	U	18(17)	9.5	<1-20	0
Tantalum	1	ppm	U	18	<0.5	All <0.5	0
Titanium	1	ppm	U	18(3)	0.7	<0.3-1.0	0
Tungsten	200	ppm	235U	18(1)	140	<70-140	0
Uranium	(3)	Percent Weight	Weight	18	67.582	67.56-67.60	0
Uranium Hexafluoride	99.5	Percent Weight	Weight	18	99.960	99.92-99.98	0
Uranium-235	0.7103	Percent Weight	Weight	18	0.71109	0.7108-0.7125	0
Vanadium	200	ppm	235U	18	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-2. Specification Analyses for Allied Chemical Natural Feed, CY 1970

Measurement	Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	28	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	28	0.17	0.01-1.00	0
Bromine	5	ppm	U	28(19)	1.4	<1-3	0
Chlorine	100	ppm	U	28	30	13-63	0
Chromium	1500	ppm	235U	28(1)	280	<280-280	0
Cylinder Pressure	75	PSIA	At 200°F	28	59.2	49.7-82.7	1
Hydrocarbons, etc.	0.01	Percent	Mole	28	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	28(2)	42	<28-42	0
Niobium	1	ppm	U	28	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	28	86.4	22-188	0
Phosphorus	50	ppm	U	28	<20	All <20	0
Ruthenium	1	ppm	U	28	<1	All <1	0
Silicon	100	ppm	U	28	12	2-35	0
Tantalum	1	ppm	U	28	<0.5	All <0.5	0
Titanium	1	ppm	U	28	0.7	<0.3-0.7	0
Tungsten	200	ppm	235U	28(1)	<70	All <70	0
Uranium	(3)	Percent	Weight	28	67.605	67.59-67.62	0
Uranium Hexafluoride	99.5	Percent	Weight	28	99.980	99.95-100	0
Uranium-235	0.7103	Percent	Weight	28	0.71127	0.7106-0.7114	0
Vanadium	200	ppm	235U	28	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-3. Specification Analyses for Allied Chemical Natural Feed, CY 1971

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	12	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	12	0.05	0.002-0.22	0
Bromine	5	ppm	U	12(2)	1.5	<1-2	0
Chlorine	100	ppm	U	12	32	10-73	0
Chromium	1500	ppm	235U	12	<280	All <280	0
Cylinder Pressure	75	PSIA	At 200°F	12	51.9	47-58	0
Hydrocarbons, etc.	0.01	Percent	Mole	12	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	12	<28	All <28	0
Niobium	1	ppm	U	12	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	12	36.3	2-86	0
Phosphorus	50	ppm	U	12	<20	All <20	0
Ruthenium	1	ppm	U	12	<1	All <1	0
Silicon	100	ppm	U	12	7.3	2-35	0
Tantalum	1	ppm	U	12	<0.5	All <0.5	0
Titanium	1	ppm	U	12	<0.3	All <0.3	0
Tungsten	200	ppm	235U	12	<70	All <70	0
Uranium	(3)	Percent	Weight	12	67.598	67.59-67.62	0
Uranium Hexafluoride	99.5	Percent	Weight	12	99.989	99.96-100	0
Uranium-235	0.7103	Percent	Weight	12	0.71084	0.7106-0.7110	0
Vanadium	200	ppm	235U	12	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-4. Specification Analyses for Allied Chemical Natural Feed, CY 1972

Measurement	Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	(1)	ppm	UF ₆	9	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	Used	9(1)	1.8	<1.8-1.8	0
Bromine	5	ppm	U	9	<1	All <1	0
Chlorine	100	ppm	U	9	30.4	22-39	0
Chromium	1500	ppm	235U	9	<700	All <700	0
Cylinder Pressure	75	PSIA	At 200°F	9	57.2	51-63	0
Hydrocarbons, etc.	0.01	Percent	Mole	9	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	9	<28	All <28	0
Niobium	1	ppm	U	9	<0.2	All 0.2	0
Nonvolatile Fluorides	300	ppm	U	9	26.3	3-70	0
Phosphorus	50	ppm	U	9	<20	All <20	0
Ruthenium	1	ppm	U	9	<1	All <1	0
Silicon	100	ppm	U	9	10.1	3-35	0
Tantalum	1	ppm	U	9	<0.5	All <0.5	0
Titanium	1	ppm	U	9	<0.3	All <0.3	0
Tungsten	200	ppm	235U	9	<70	All <70	0
Uranium	(3)	Percent	Weight	9	67.603	67.60-67.61	-
Uranium Hexafluoride	99.5	Percent	Weight	9	99.977	99.97-99.99	0
Uranium-235	0.7103	Percent	Weight	9	0.71079	0.7107-0.7110	0
Vanadium	200	ppm	235U	9	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-5. Specification Analyses for Allied Chemical Natural Feed, CY 1973

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	18	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	18	<1.8	All <1.8	0
Bromine	5	ppm	U	18	<1	All <1	0
Chlorine	100	ppm	U	18	38.6	19-77	0
Chromium	1500	ppm	235U	18	<700	All <700	0
Cylinder Pressure	75	PSIA	At 200°F	18	61.3	45-67	0
Hydrocarbons, etc.	0.01	Percent	Mole	18	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	18	<28	All <28	0
Niobium	1	ppm	U	18	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	18	80.2	0-255	0
Phosphorus	50	ppm	U	18	<20	All <20	0
Ruthenium	1	ppm	U	18	<1	All <1	0
Silicon	100	ppm	U	18(14)	10.8	<2-30	0
Tantalum	1	ppm	U	18	<0.5	All <0.5	0
Titanium	1	ppm	U	18	<0.3	All <0.3	0
Tungsten	200	ppm	235U	18	<70	All <70	0
Uranium	(3)	Percent	Weight	18	67.599	67.54-67.61	0
Uranium Hexafluoride	99.5	Percent	Weight	18	99.974	99.88-99.99	0
Uranium-235	0.7103	Percent	Weight	18	0.71090	0.7107-0.7110	0
Vanadium	200	ppm	235U	18	<42	All 42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-6. Specification Analyses for BNFL (British) Natural Feed, CY 1969

Measurement	Feed		Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
	Specification Level (1)	Level (1)						
Antimony	1	1	ppm	U	51	<1	All <1	0
Boron Equivalent Cross Section	8	8	ppm	U	51	0.26	0.02-1.82	0
Bromine	5	5	ppm	U	51(5)	1.0	<1-1	0
Chlorine	100	100	ppm	U	51	30.8	19-96	0
Chromium	1500	1500	ppm	235U	51	<280	All <280	0
Cylinder Pressure	75	75	PSIA	At 200°F	51(12)	68.4	55-98	2
Hydrocarbons, etc.	0.01	0.01	Percent	Mole	51	<0.01	All <0.01	0
Molybdenum	200	200	ppm	235U	51(7)	52.5	<28-84	0
Niobium	1	1	ppm	U	51	<0.2	All <0.2	0
Nonvolatile Fluorides	300	300	ppm	U	51	53.0	28-86	0
Phosphorus	50	50	ppm	U	51	<20	All <20	0
Ruthenium	1	1	ppm	U	51	<1	All <1	0
Silicon	100	100	ppm	U	51	7.5	2-15	0
Tantalum	1	1	ppm	U	51	<0.5	All <0.5	0
Titanium	1	1	ppm	U	51	<0.3	All <0.3	0
Tungsten	200	200	ppm	235U	51	<70	All <70	0
Uranium	(3)	(3)	Percent	Weight	51	67.599	67.58-67.62	0
Uranium Hexafluoride	99.5	99.5	Percent	Weight	51	99.977	99.94-100	0
Uranium-235	0.7103	0.7103	Percent	Weight	51	0.71102	0.7100-0.7116	1
Vanadium	200	200	ppm	235U	51	<42	All < 42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-7. Specification Analyses for BNFL (British) Natural Feed, CY 1970

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples(2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	92(1)	1	<1-1	0
Boron Equivalent Cross Section	8	ppm	U	92	0.28	0.01-1.62	0
Bromine	5	ppm	U	92(59)	1.5	<1-4	0
Chlorine	100	ppm	U	92	26.8	10-54	0
Chromium	1500	ppm	235U	92(1)	560	<280-560	0
Cylinder Pressure	75	PSIA	At 200°F	92	60.3	42-95	7
Hydrocarbons, etc.	0.01	Percent	Mole	92	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	92(1)	140	<28-140	0
Niobium	1	ppm	U	92	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	92	83.4	12-211	0
Phosphorus	50	ppm	U	92	<20	All <20	0
Ruthenium	1	ppm	U	92	<1	All <1	0
Silicon	100	ppm	U	92(90)	10.1	<2-45	0
Tantalum	1	ppm	U	92(2)	0.70	<0.5-0.8	0
Titanium	1	ppm	U	92(7)	0.60	<0.3-1.2	1
Tungsten	200	ppm	235U	92(1)	126	<70-126	0
Uranium	(3)	Percent	Weight	92	67.603	67.58-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	92	99.978	99.94-100	0
Uranium-235	0.7103	Percent	Weight	92	0.71093	0.7082-0.7116	7
Vanadium	200	ppm	235U	92(1)	42	<42-42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-8. Specification Analyses for BNFL (British) Natural Feed, CY 1971

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples(2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	8	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U ^{235U}	8	0.21	0.04-0.64	0
Bromine	5	ppm	U	8(1)	2	<1-2	0
Chlorine	100	ppm	U	8	20.4	16-58	0
Chromium	1500	ppm	235U	8	<280	All <280	0
Cylinder Pressure	75	PSIA	At 200°F	8	60.6	48-66	0
Hydrocarbons, etc.	0.01	Percent	Mole	8	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	8(5)	72.8	<28-98	0
Niobium	1	ppm	U	8	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	8	61.6	35-185	0
Phosphorus	50	ppm	U	8	<20	All <20	0
Ruthenium	1	ppm	U	8	<1	All <1	0
Silicon	100	ppm	U	8	8.9	4-15	0
Tantalum	1	ppm	U	8	<0.5	All <0.5	0
Titanium	1	ppm	U	8(4)	0.48	<0.3-0.6	0
Tungsten	200	ppm	235U	8	<70	All <70	0
Uranium	(3)	Percent	Weight	8	67.596	67.58-67.60	0
Uranium Hexafluoride	99.5	Percent	Weight	8	99.965	99.94-99.97	0
Uranium-235	0.7103	Percent	Weight	8	0.71058	0.7096-0.7111	2
Vanadium	200	ppm	235U	8	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-9. Specification Analyses for BNFL (British) Natural Feed, CY 1972

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	12	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	12	<1.8	All <1.8	0
Bromine	5	ppm	U	12	<1	All <1	0
Chlorine	100	ppm	U	12	27.4	12-41	0
Chromium	1500	ppm	²³⁵ U	12	<280	All <280	0
Cylinder Pressure	75	PSIA	At 200°F	14	69	52->100	3
Hydrocarbons, etc.	0.01	Percent	Mole	12	<0.01	All <0.01	0
Molybdenum	200	ppm	²³⁵ U	12(1)	84	<28-84	0
Niobium	1	ppm	U	12	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	12	20.0	4-70	0
Phosphorus	50	ppm	U	12	<20	All <20	0
Ruthenium	1	ppm	U	12	<1	All <1	0
Silicon	100	ppm	U	12(10)	9.0	<2-35	0
Tantalum	1	ppm	U	12	<0.5	All <0.5	0
Titanium	1	ppm	U	12(2)	0.35	<0.3-0.4	0
Tungsten	200	ppm	²³⁵ U	12	<70	All <70	0
Uranium	(3)	Percent	Weight	14	67.611	67.59-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	14	99.990	99.96-100	0
Uranium-235	0.7103	Percent	Weight	14	0.71106	0.7109-0.7112	0
Vanadium	200	ppm	²³⁵ U	12	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-10. Specification Analyses for BNFL (British) Natural Feed, CY 1973

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	9	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	9(1)	2.5	<1.8-2.5	0
Bromine	5	ppm	U	9	<1	All <1	0
Chlorine	100	ppm	U	9	40.2	15-79	0
Chromium	1500	ppm	235U	9	<700	All <700	0
Cylinder Pressure	75	PSIA	At 200°F	9	59.9	49-66	0
Hydrocarbons, etc.	0.01	Percent	Mole	9	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	9	<28	All <28	0
Niobium	1	ppm	U	9	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	9	100.6	40-275	0
Phosphorus	50	ppm	U	9	<20	All <20	0
Ruthenium	1	ppm	U	9	<1	All <1	0
Silicon	100	ppm	U	9	12.1	2-35	0
Tantalum	1	ppm	U	9	<0.5	All <0.5	0
Titanium	1	ppm	U	9(1)	1.0	<0.3-1.0	0
Tungsten	200	ppm	235U	9	<70	All <70	0
Uranium	(3)	Percent	Weight	9	67.596	67.58-67.61	-
Uranium Hexafluoride	99.5	Percent	Weight	9	99.963	99.94-99.99	0
Uranium-235	0.7103	Percent	Weight	9	0.71093	0.7107-0.7111	0
Vanadium	200	ppm	235U	9	<42	All <42	0

(1) All levels are maximums except UF₆ and 235U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-11. Specification Analyses for Comhurex (French) Natural Feed, CY 1969

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	11	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	11	0.20	0.01-1.01	0
Bromine	5	ppm	U	11	<1	All <1	0
Chlorine	100	ppm	U	11	26.2	10-57	0
Chromium	1500	ppm	235U	11(1)	700	<280-700	0
Cylinder Pressure	75	PSIA	At 200°F	11	62.2	53-75	0
Hydrocarbons, etc.	0.01	Percent	Mole	11	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	11(4)	102	<28-140	0
Niobium	1	ppm	U	11	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	11	80.1	11-130	0
Phosphorus	50	ppm	U	11	<20	All <20	0
Ruthenium	1	ppm	U	11	<1	All <1	0
Silicon	100	ppm	U	11(8)	6.5	<2-10	0
Tantalum	1	ppm	U	11	<0.5	All <0.5	0
Titanium	1	ppm	U	11	<0.3	All <0.3	0
Tungsten	200	ppm	235U	11	<70	All <70	0
Uranium	(3)	Percent	Weight	11	67.604	67.58-67.62	0
Uranium Hexafluoride	99.5	Percent	Weight	11	99.978	99.95-100	0
Uranium-235	0.7103	Percent	Weight	11	0.71106	0.7108-0.7114	0
Vanadium	200	ppm	235U	11	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-12. Specification Analyses for Comhurex (French) Natural Feed, CY 1970

Measurement	Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	10	ppm	U ²³⁵ D	16	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	16	0.25	0.03-1.13	0
Bromine	5	ppm	U	16(9)	1.2	<1-2	0
Chlorine	100	ppm	U	16(10)	40.8	17-98	0
Chromium	1500	ppm	235U	16(3)	373	<280-420	0
Cylinder Pressure	75	PSIA	At 200°F	16	62.4	50-71	0
Hydrocarbons, etc.	0.01	Percent	Mole	16	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	16(8)	56	<28-84	0
Niobium	1	ppm	U	16	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	16	77.5	27-193	0
Phosphorus	50	ppm	U	16	<20	All <20	0
Ruthenium	1	ppm	U	16	<1	All <1	0
Silicon	100	ppm	U	16(15)	11.1	<2-25	0
Tantalum	1	ppm	U	16	<0.5	All <0.5	0
Titanium	1	ppm	U	16	<0.3	All <0.3	0
Tungsten	200	ppm	235U	16	<70	All <70	0
Uranium	(3)	Percent	Weight	16	67.598	67.58-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	16	99.971	99.95-100	0
Uranium-235	0.7103	Percent	Weight	16	0.71108	0.7108-0.7112	0
Vanadium	200	ppm	235U	16	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-13. Specification Analyses for Comhurex (French) Natural Feed, CY 1971

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples(2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	11	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	11(9)	0.04	<0.01-0.12	0
Bromine	5	ppm	U	11(1)	1	<1-1	0
Chlorine	100	ppm	U	11	27.2	15-40	0
Chromium	1500	ppm	235U	11	<280	All <280	0
Cylinder Pressure	75	PSIA	At 200°F	11	80	60-107	5
Hydrocarbons, etc.	0.01	Percent	Mole	11	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	11(2)	77.0	<28-98	0
Niobium	1	ppm	U	11	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	11	31.7	0-60	0
Phosphorus	50	ppm	U	11	<20	All <20	0
Ruthenium	1	ppm	U	11	<1	All <1	0
Silicon	100	ppm	U	11(9)	6.8	<2-10	0
Tantalum	1	ppm	U	11	<0.5	All <0.5	0
Titanium	1	ppm	U	11	<0.3	All <0.3	0
Tungsten	200	ppm	235U	11	<70	All <70	0
Uranium	(3)	Percent	Weight	11	67.603	67.59-67.61	-
Uranium Hexafluoride	99.5	Percent	Weight	11	99.976	99.96-99.99	0
Uranium-235	0.7103	Percent	Weight	11	0.71092	0.7105-0.7112	0
Vanadium	200	ppm	235U	11	<42	All <42	0

(1) All levels are maximums except UF6 and 235U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-14. Specification Analyses for Comhurex (French) Natural Feed, CY 1972

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	300	ppm	U ₃₀₀	6	<1.0	All <1.0	0
Boron Equivalent Cross Section	8	ppm	U	6	<1.8	All <1.8	0
Bromine	5	ppm	U	6	<1.0	All <1.0	0
Chlorine	100	ppm	U	6	28.7	23-33	0
Chromium	1500	ppm	235U	6	<280	All <280	0
Cylinder Pressure	75	PSIA	At 200°F	6	62.8	59-65	0
Hydrocarbons, etc.	0.01	Percent	Mole	6	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	6	<28	All <28	0
Niobium	1	ppm	U	6	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	6	26.3	4-53	0
Phosphorus	50	ppm	U	6	<20	All <20	0
Ruthenium	1	ppm	U	6	<1	All <1	0
Silicon	100	ppm	U	6	5.8	4-8	0
Tantalum	1	ppm	U	6	<0.5	All <0.5	0
Titanium	1	ppm	U	6	<0.3	All <0.3	0
Tungsten	200	ppm	235U	6	<70	All <70	0
Uranium	(3)	Percent	Weight	6	67.605	67.58-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	6	99.980	99.94-100	0
Uranium-235	0.7103	Percent	Weight	6	0.71097	0.7107-0.7112	0
Vanadium	200	ppm	235U	6	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-15. Specification Analyses for Comhurex (French) Natural Feed, CY 1973

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	9	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	9	<1.8	All 1.8	0
Bromine	5	ppm	U	9	<1	All <1	0
Chlorine	100	ppm	U	9	34.4	4-59	0
Chromium	1500	ppm	235U	9	<700	All <700	0
Cylinder Pressure	.75	PSIA	At 200°F	10	58.6	50-66	0
Hydrocarbons, etc.	0.01	Percent	Mole	9	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	9	<28	All <28	0
Niobium	1	ppm	U	9	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	9	63.8	5-172	0
Phosphorus	50	ppm	U	9	<20	All <20	0
Ruthenium	1	ppm	U	9	<1	All <1	0
Silicon	100	ppm	U	9(8)	6.8	<2-15	0
Tantalum	1	ppm	U	9	<0.5	All <0.5	0
Titanium	1	ppm	U	9	<0.3	All <0.3	0
Tungsten	200	ppm	235U	9	<70	All <70	0
Uranium	(3)	Percent	Weight	10	67.606	67.60-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	10	99.980	99.97-100	0
Uranium-235	0.7103	Percent	Weight	10	0.71083	0.7101-0.7112	1
Vanadium	200	ppm	235U	9	<42	All <42	0

(1) All levels are maximums except UF6 and 235U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-16. Specification Analyses for Eldorado Nuclear Natural Feed, CY 1970

Measurement	Feed Specification		Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
	Level (1)	Level (1)						
Antimony	1	1	ppm	U	5	<1	All <1	0
Boron Equivalent Cross Section	(8)	8	ppm	U	5	0.25	0.04-0.88	0
Bromine	5	5	ppm	U	5(1)	1	<1-1	0
Chlorine	100	100	ppm	U	5	20.8	13-28	0
Chromium	1500	1500	ppm	235U	5(1)	560	<280-560	0
Cylinder Pressure	75	75	PSIA	At 200°F	5	64.8	60-73	0
Hydrocarbons, etc.	0.01	0.01	Percent	Mole	5	<0.01	All <0.01	0
Molybdenum	200	200	ppm	235U	5	<28	All <28	0
Niobium	1	1	ppm	U	5	<0.2	All 0.2	0
Nonvolatile Fluorides	300	300	ppm	U	5	104	40-217	0
Phosphorus	50	50	ppm	U	5	<20	All <20	0
Ruthenium	1	1	ppm	U	5	<1	All <1	0
Silicon	100	100	ppm	U	5	9.8	7-15	0
Tantalum	1	1	ppm	U	5	<0.5	All <0.5	0
Titanium	1	1	ppm	U	6	<0.3	All <0.3	0
Tungsten	200	200	ppm	235U	5	<70	All <70	0
Uranium	(3)	(3)	Percent	Weight	5	67.602	67.58-67.62	-
Uranium Hexafluoride	99.5	99.5	Percent	Weight	5	99.978	99.95-100	0
Uranium-235	0.7103	0.7103	Percent	Weight	5	0.71108	0.7109-0.7112	0
Vanadium	200	200	ppm	235U	5	<42	All <42	0

(1) All levels are maximums except UF₆ and 235U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-17. Specification Analyses for Eldorado Nuclear Natural Feed, CY 1971

Measurement	Feed		Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
	Specification Level (1)	Units						
Antimony	1	ppm	U	15	<1	All <1	0	
Boron Equivalent Cross Section	8	ppm	U	15	0.24	0-2.07	0	
Bromine	5	ppm	U	15	<1	All <1	0	
Chlorine	100	ppm	U	15	27.5	14-54	0	
Chromium	1500	ppm	235U	15	<280	All <280	0	
Cylinder Pressure	75	PSIA	At 200°F	15	62.2	51-115	0	
Hydrocarbons, etc.	0.01	Percent	Mole	15	<0.01	All <0.01	1	
Molybdenum	200	ppm	235U	15	<28	All <28	0	
Niobium	1	ppm	U	15	<0.2	All <0.2	0	
Nonvolatile Fluorides	300	ppm	U	15	47.8	5-90	0	
Phosphorus	50	ppm	U	15	<20	All <20	0	
Ruthenium	1	ppm	U	15	<1	All <1	0	
Silicon	100	ppm	U	15(11)	8.5	<2-25	0	
Tantalum	1	ppm	U	15	<0.5	All <0.5	0	
Titanium	1	ppm	U	16	<0.3	All <0.3	0	
Tungsten	200	ppm	235U	15	<70	All <70	0	
Uranium	(3)	Percent	Weight	15	67.599	67.57-67.61	-	
Uranium Hexafluoride	99.5	Percent	Weight	15	99.971	99.93-99.99	0	
Uranium-235	0.7103	Percent	Weight	15	0.71115	0.7108-0.7114	0	
Vanadium	200	ppm	235U	15	<42	All <42	0	

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(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-18. Specification Analyses for Eldorado Nuclear Natural Feed, CY 1972

Measurement	Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	13	<1	All <1	0
Boron Equivalent Cross Section	(8)	ppm	U	13	<1.8	All <1.8	0
Bromine	5	ppm	U	13	<1	All <1	0
Chlorine	100	ppm	U	13	32.2	24-42	0
Chromium	1500	ppm	235U	24(17)	3000	<700-14000	8
Cylinder Pressure	75	PSIA	At 200°F	24(11)	58.7	45-82	1
Hydrocarbons, etc.	0.01	Percent	Mole	13	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	13	<28	All <28	0
Niobium	1	ppm	U	13	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	13	48.2	3-154	0
Phosphorus	50	ppm	U	13	<20	All <20	0
Ruthenium	1	ppm	U	13	<1	All <1	0
Silicon	100	ppm	U	13(11)	7.0	<2-20	0
Tantalum	1	ppm	U	13	<0.5	All <0.5	0
Titanium	1	ppm	U	13(2)	0.65	<0.3-0.8	0
Tungsten	200	ppm	235U	13	<70	All <70	0
Uranium	(3)	Percent	Weight	25	67.605	67.58-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	25	99.981	99.94-100	0
Uranium-235	0.7103	Percent	Weight	25	0.71109	0.7109-0.7113	0
Vanadium	200	ppm	235U	13	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-19. Specification Analyses for Eldorado Nuclear Natural Feed, CY 1973

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	12	<1	All <1	0
Boron Equivalent Cross Section	(3) 8	ppm	U	12(1)	1.8	<1.8-1.8	0
Bromine	5	ppm	U	12	<1	All <1	0
Chlorine	100	ppm	U	12	35.0	19-65	0
Chromium	1500	ppm	²³⁵ U	12	<700	All <700	0
Cylinder Pressure	75	PSIA	At 200°F	12	57.9	49-67	0
Hydrocarbons, etc.	0.01	Percent	Mole	12	<0.01	All <0.01	0
Molybdenum	200	ppm	²³⁵ U	12	<28	All <28	0
Niobium	1	ppm	U	12	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	12	65.1	8-210	0
Phosphorus	50	ppm	U	12	<20	All <20	0
Ruthenium	1	ppm	U	12	<1	All <1	0
Silicon	100	ppm	U	12(11)	10.3	<2-25	0
Tantalum	1	ppm	U	12	<0.5	All <0.5	0
Titanium	1	ppm	U	12	<0.3	All <0.3	0
Tungsten	200	ppm	²³⁵ U	12	<70	All <70	0
Uranium	(3)	Percent	Weight	12	67.601	67.56-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	12	99.975	99.91-100	0
Uranium-235	0.7103	Percent	Weight	12	0.71113	0.7108-0.7114	0
Vanadium	200	ppm	²³⁵ U	12	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-20. Specification Analyses for Kerr-McGee Natural Feed, CY 1970

Measurement	Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	10	ppm	U	26	<1	All <1	0
Boron Equivalent Cross Section	(8)	ppm	U	26	0.28	0.02-2.59	0
Bromine	5	ppm	U	25(17)	1.5	<1-3	0
Chlorine	100	ppm	U	26	24.4	8-63	0
Chromium	1500	ppm	235U	26(2)	630	<280-980	0
Cylinder Pressure	75	PSIA	At 200°F	26	57.8	47-80	0
Hydrocarbons, etc.	0.01	Percent	Mole	26	<0.01	All <0.01	2
Molybdenum	200	ppm	235U	26(8)	57.6	<28-70	0
Niobium	1	ppm	U	26	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	26	73.8	19-202	0
Phosphorus	50	ppm	U	26	<20	All <20	0
Ruthenium	1	ppm	U	26	<1	All <1	0
Silicon	100	ppm	U	26(23)	9.5	<2-20	0
Tantalum	1	ppm	U	26	<0.5	All <0.5	0
Titanium	1	ppm	U	26	<0.3	All <0.3	0
Tungsten	200	ppm	235U	26	<70	All <70	0
Uranium	(3)	Percent	Weight	26	67.604	67.58-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	26	99.979	99.94-100	0
Uranium-235	0.7103	Percent	Weight	26	0.71092	0.7106-0.7113	0
Vanadium	200	ppm	235U	26	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-21. Specification Analyses for Kerr-McGee Natural Feed, CY 1971

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples(2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	51	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	51(49)	0.23	<0.01-1.66	0
Bromine	5	ppm	U	51(5)	1.2	<1-2	0
Chlorine	100	ppm	U	51	23.2	7-67	0
Chromium	1500	ppm	235U	51(2)	280	<280-280	0
Cylinder Pressure	75	PSIA	At 200°F	51	56.6	45-70	0
Hydrocarbons, etc.	0.01	Percent	Mole	51	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	51(13)	50.6	<28-98	0
Niobium	1	ppm	U	51	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	51	61.5	3-157	0
Phosphorus	50	ppm	U	51	<20	All <20	0
Ruthenium	1	ppm	U	51	<1	All <1	0
Silicon	100	ppm	U	51(50)	7.0	<2-25	0
Tantalum	1	ppm	U	51	<0.5	All <0.5	0
Titanium	1	ppm	U	51	<0.3	All <0.3	0
Tungsten	200	ppm	235U	51	<70	All <70	0
Uranium	(3)	Percent	Weight	51	67.602	67.58-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	51	99.976	99.94-100	0
Uranium-235	0.7103	Percent	Weight	51	0.71092	0.7106-0.7115	0
Vanadium	200	ppm	235U	51	<42	All <42	0

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(1) All levels are maximums except UF₆ and 235U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-22. Specification Analyses for Kerr-McGee Natural Feed, CY 1972

Measurement	Feed Specification		Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
	Level (1)	Level (1)						
Antimony	100	100	ppm	U	17	<1.8	All <1.8	0
Boron Equivalent Cross Section	(8)	(8)	ppm	U	17	<1.8	All <1.8	0
Bromine	75	75	ppm	U	17(1)	1.8	<1-1.8	0
Chlorine	100	100	ppm	U	17	25.23	10-43	0
Chromium	1500	1500	ppm	235U	18(4)	630	<280-980	0
Cylinder Pressure	75	75	PSIA	At 200°F	19	57.4	50-70	0
Hydrocarbons, etc.	0.01	0.01	Percent	Mole	17	<0.01	All <0.01	0
Molybdenum	200	200	ppm	235U	17	<28	All <28	0
Niobium	1	1	ppm	U	17	<0.2	All <0.2	0
Nonvolatile Fluorides	300	300	ppm	U	17	27.6	3-92	0
Phosphorus	50	50	ppm	U	17	<20	All <20	0
Ruthenium	1	1	ppm	U	17	<1	All <1	0
Silicon	100	100	ppm	U	17(16)	7.9	<2-35	0
Tantalum	1	1	ppm	U	17	<0.5	All <0.5	0
Titanium	1	1	ppm	U	17	<0.3	All <0.3	0
Tungsten	200	200	ppm	235U	17	<70	All <70	0
Uranium	(3)	(3)	Percent	Weight	19	67.607	67.58-67.62	-
Uranium Hexafluoride	99.5	99.5	Percent	Weight	19	99.984	99.94-100	0
Uranium-235	0.7103	0.7103	Percent	Weight	19	0.71086	0.7105-0.7110	0
Vanadium	200	200	ppm	235U	17	<42	All <42	0

(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-23. Specification Analyses for Kerr-McGee Natural Feed, CY 1973

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	19	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	19(1)	3.1	<1.8-3.1	0
Bromine	5	ppm	U	19	<1	All <1	0
Chlorine	100	ppm	U	19	38.5	1-68	0
Chromium	1500	ppm	²³⁵ U	25(9)	2300	<700-7700	5
Cylinder Pressure	175	PSIA	At 200°F	25	56.2	40-67	0
Hydrocarbons, etc.	0.01	Percent	Mole	19	<0.01	All <0.01	0
Molybdenum	200	ppm	²³⁵ U	19(1)	.98	<28-98	0
Niobium	1	ppm	U	19	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	19	57.4	2-171	0
Phosphorus	50	ppm	U	19	<20	All <20	0
Ruthenium	1	ppm	U	19	<1	All <1	0
Silicon	100	ppm	U	19	10.5	2-29	0
Tantalum	1	ppm	U	19	<0.5	All <0.5	0
Titanium	1	ppm	U	19	<0.3	All <0.3	0
Tungsten	200	ppm	²³⁵ U	19	<70	All <70	0
Uranium	(3)	Percent	Weight	25	67.600	67.58-67.62	-
Uranium Hexafluoride	99.5	Percent	Weight	25	99.973	99.94-100	0
Uranium-235	0.7103	Percent	Weight	24	0.71082	0.7104-0.7110	0
Vanadium	200	ppm	²³⁵ U	19	<42	All <42	0

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(1) All levels are maximums except UF₆ and ²³⁵U which are minimums.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-24. Specification Analyses for BNFL (British) Reactor Returns, CY 1970

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	10	ppm	U	2	<1	All <1	0
Boron Equivalent Cross Section	28	ppm	U	2	0.59	0.55-0.63	0
Bromine	5.110	ppm	U	2	<1	All <1	0
Chlorine	100	ppm	U	2	18.5	18-19	0
Chromium	1500	ppm	235U	2	<110	All <110	0
Cylinder Pressure	75	PSIA	At 200°F	2	58.5	58-59	0
Fission Product Gamma	20	Percent of Aged		2	<5	All <5	0
Fission Product Beta	10	Percent Natural U		2	<2	All <2	0
Hydrocarbons, etc.	0.01	Percent Mole		2	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	2	<11	All <11	0
Niobium	1	ppm	U	2	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	2	40.5	28-53	0
Phosphorus	50	ppm	U	2	<20	All <20	0
Ruthenium	1	ppm	U	2	<1	All <1	0
Silicon	100	ppm	U	2	14	8-20	0
Tantalum	1	ppm	U	2	<0.5	All <0.5	0
Titanium	1	ppm	U	2	<0.3	All <0.3	0
Transuranic Alpha	1500	d/m/g	U	2	185.5	23-348	0
Tungsten	200	ppm	235U	2	<28	All <28	0
Uranium	(3)	Percent	Weight	2	67.610	67.60-67.62	0
Uranium Hexafluoride	99.5	Percent	Weight	2	99.985	99.97-100	0
Uranium-232	0.110	ppm	235U	2	<0.01	All <0.01	0
Uranium-233	500	ppm	235U	2	<275	All <275	0
Uranium-234	(3)	Percent	Weight	2	0.0205	0.020-0.021	0
Uranium-235	(3)	Percent	Weight	2	1.30495	0.8025-1.8074	0
Uranium-236	(3)	Percent	Weight	2	0.0505	0.048-0.053	0
Vanadium	200	ppm	235U	2	<16	All <16	0

(1) All levels are maximums except UF₆.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-25. Specification Analyses for BNFL (British) Reactor Returns, CY 1972

Measurement	Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	2	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	2	<1.8	All <1.8	0
Bromine	5	ppm	U	2	<1	All <1	0
Chlorine	100	ppm	U	2	38.0	37-39	0
Chromium	1500	ppm	²³⁵ U	2	<260	All <260	0
Cylinder Pressure	75	PSIA	At 200°F	2	57.0	54-60	0
Fission Product Gamma	20	Percent of Aged		2	<5	All <5	0
Fission Product Beta	10	Percent of Aged		2	<2	All <2	0
Hydrocarbons, etc.	0.01	Percent Mole	Natural U	2	<0.01	All <0.01	0
Molybdenum	200	ppm	²³⁵ U	2	<10	All <10	0
Niobium	1	ppm	U	2	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	2	77.5	58-97	0
Phosphorus	50	ppm	U	2	<20	All <20	0
Ruthenium	1	ppm	U	2	<1	All <1	0
Silicon	100	ppm	U	2	9.5	9-10	0
Tantalum	1	ppm	U	2	<0.5	All <0.5	0
Titanium	1	ppm	U	2	<0.3	All <0.3	0
Transuranic Alpha	1500	d/m/g	U	2	386.0	325-425	0
Tungsten	200	ppm	²³⁵ U	2	<26	All <26	0
Uranium	(3)	Percent Weight	Weight	2	67.600	67.59-67.61	0
Uranium Hexafluoride	99.5	Percent Weight	Weight	2	99.965	99.96-99.99	0
Uranium-232	0.110	ppm	²³⁵ U	2	0.0035	0.003-0.004	0
Uranium-233	500	ppm	²³⁵ U	2	<100	All <100	0
Uranium-234	(3)	Percent Weight	Weight	2	0.0230	All 0.023	0
Uranium-235	(3)	Percent Weight	Weight	2	1.91665	1.9152-1.9181	0
Uranium-236	(3)	Percent Weight	Weight	2	0.0710	All 0.071	0
Vanadium	200	ppm	²³⁵ U	2	<16	All <16	0

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(1) All levels are maximums except UF₆.
 (2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.
 (3) Not a specific specification.

Table A-26. Specification Analyses for BNFL (British) Reactor Returns, CY 1973

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	7	<1	All <1	0
Boron Equivalent Cross Section	(8)	ppm	U	7(2)	2.7	<1.8-3.0	0
Bromine	5	ppm	U	7	<1	All <1	0
Chlorine	100	ppm	U	7	45.8	25-66	0
Chromium	1500	ppm	235U	7	<420	All <420	0
Cylinder Pressure	.75	PSIA	At 200°F	7	56.8	50-63	0
Fission Product, Gamma	20	Percent of Aged		7	<5	All <5	0
Fission Product Beta	10	Percent Natural U		7	<2	All <2	0
Hydrocarbons, etc.	0.01	Percent Mole		7	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	7	<17	All <17	0
Niobium	1	ppm	U	7	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	7	80.7	26-133	0
Phosphorus	50	ppm	U	7	<20	All <20	0
Ruthenium	1	ppm	U	7	<1	All <1	0
Silicon	100	ppm	U	7(6)	5.5	<2-12	0
Tantalum	1	ppm	U	7	<0.5	All <0.5	0
Titanium	1	ppm	U	7	<0.3	All <0.3	0
Transuranic Alpha	1500	d/m/g	U	7(6)	140.5	<1-214	0
Tungsten	200	ppm	235U	7	<19	All <19	0
Uranium	(3)	Percent Weight	Weight	7	67.600	67.59-67.61	0
Uranium Hexafluoride	99.5	Percent Weight	Weight	7	99.970	99.96-99.98	0
Uranium-232	0.110	ppm	235U	7	0.0040	0.002-0.006	0
Uranium-233	500	ppm	235U	7	<100	All <100	0
Uranium-234	(3)	Percent Weight	Weight	7	0.0140	0.011-0.032	0
Uranium-235	(3)	Percent Weight	Weight	7	1.37480	1.1618-2.6363	0
Uranium-236	(3)	Percent Weight	Weight	7	0.0447	0.037-0.071	0
Vanadium	200	ppm	235U	7	<26	All <26	0

(1) All levels are maximums except UF₆.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-27. Specification Analyses for Cogema (French) Reactor Returns, CY 1969

Measurement	Feed Specification Level(1)	Units	Basis	Number of Samples(2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	10	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	10	0.46	0.01-1.04	0
Bromine	5	ppm	U	10(9)	1	<1-1	0
Chlorine	100	ppm	U	10	46	28-63	0
Chromium	1500	ppm	235U	10(1)	150	<68-150	0
Cylinder Pressure	75	PSIA	At 200°F	10	60.1	57.7-62.7	0
Fission Product Gamma	20	Percent of Aged		10(1)	100	<5-100	0
Fission Product Beta	10	Natural U		10(1)	13	<2-13	1
Hydrocarbons, etc.	0.01	Percent Mole		10	<0.01	All <0.01	1
Molybdenum	200	ppm	235U	10	148	20-350	0
Niobium	1	ppm	U	10	<0.2	All <0.2	3
Nonvolatile Fluorides	300	ppm	U	10	44	12-108	0
Phosphorus	50	ppm	U	10	<20	All <20	0
Ruthenium	1	ppm	U	10	<1	All <1	0
Silicon	100	ppm	U	10	7.8	4-13	0
Tantalum	1	ppm	U	10	<5	All <5	0
Titanium	1	ppm	U	10(7)	0.4	<0.2-0.5	0
Transuranic Alpha	1500	d/m/g	U	10	<150	All <150	0
Tungsten	200	ppm	235U	10	<37	All <37	0
Uranium	(3)	Percent Weight		10	67.595	67.582-67.610	0
Uranium Hexafluoride	99.5	Percent Weight		10	99.967	99.947-99.988	0
Uranium-232	0.110	ppm	235U	10(4)	0.025	<0.01-0.033	0
Uranium-233	500	ppm	235U	10	<100	All <100	0
Uranium-234	(3)	Percent Weight		10	0.0095	0.009-0.010	0
Uranium-235	(3)	Percent Weight		10	1.6229	1.3012-2.9509	-
Uranium-236	(3)	Percent Weight		10	0.039	0.038-0.040	-
Vanadium	200	ppm	235U	10	<22	All <22	0

(1) All levels are maximums except UF₆.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-28. Specification Analyses for Cogema (French) Reactor Returns, CY 1970

Measurement	Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	10	<1	All <1	0
Boron Equivalent Cross Section	38	ppm	U	10	0.14	0.03-0.10	0
Bromine	5	ppm	U	10(5)	1.3	<1-2	0
Chlorine	100	ppm	U	10(10)	55.18	30-87	0
Chromium	1500	ppm	235U	10(3)	376	<120-610	0
Cylinder Pressure	75	PSIA	At 200°F	10	57	51.7-64.7	0
Fission Product Gamma	20	Percent of Aged		10(9)	6.2	<5-13	0
Fission Product Beta	10	Percent Natural U		10	<2	All <2	0
Hydrocarbons, etc.	0.01	Percent Mole		10	<0.01	All 0.01	0
Molybdenum	200	ppm	235U	10(3)	17	<12-32	0
Niobium	1	ppm	U	10	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	10	58	18-206	0
Phosphorus	50	ppm	U	10	<20	All <20	0
Ruthenium	1	ppm	U	10	<1	All <1	0
Silicon	100	ppm	U	10	5.1	2-10	0
Tantalum	1	ppm	U	10	<0.5	All <0.5	0
Titanium	1	ppm	U	10(2)	0.3	<0.3-0.3	0
Transuranic Alpha	1500	d/m/g	U	10	1323	224-8989	4
Tungsten	200	ppm	235U	10	<30	All <30	0
Uranium	(3)	Percent	Weight	10	67.602	67.593-67.616	-
Uranium Hexafluoride	99.5	Percent	Weight	10	99.977	99.964-100	0
Uranium-232	0.110	ppm	235U	10	0.069	0.026-0.101	0
Uranium-233	500	ppm	235U	10(9)	86	<60-181	0
Uranium-234	(3)	Percent	Weight	10(6)	0.013	0.012-0.014	-
Uranium-235	(3)	Percent	Weight	10	1.7670	1.6490-1.9658	-
Uranium-236	(3)	Percent	Weight	10(6)	0.232	0.218-0.237	-
Vanadium	200	ppm	235U	10	<18	All <18	0

(1) All levels are maximums except UF₆.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-29. Specification Analyses for Cogema (French) Reactor Returns, CY 1972

Measurement	Feed Specification		Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
	Level (1)							
Antimony	1		ppm	U	17	<1	All <1	0
Boron Equivalent Cross Section	8		ppm	U	17	<1.8	All <1.8	0
Bromine	5		ppm	U	17	<1	All <1	0
Chlorine	100		ppm	U	17	29	20-42	0
Chromium	1500		ppm	235U	17	<700	All <700	0
Cylinder Pressure	75		PSIA	At 200°F	17	60	50-75	0
Fission Product Gamma	20		Percent	Of Aged	17	<5	All <5	0
Fission Product Beta	10		Percent	Natural U	17	<2	All <2	0
Hydrocarbons, etc.	0.01		Percent	Mole	17	<0.01	All <0.01	0
Molybdenum	200		ppm	235U	17(3)	105	<28-134	0
Niobium	1		ppm	U	17	<0.2	All <0.2	0
Nonvolatile Fluorides	300		ppm	U	17	50	2-145	0
Phosphorus	50		ppm	U	17	<20	All <20	0
Ruthenium	1		ppm	U	17	<1	All <1	0
Silicon	100		ppm	U	17	9.9	3-40	0
Tantalum	1		ppm	U	17	<0.5	All <0.5	0
Titanium	1		ppm	U	17	<0.3	All <0.3	0
Transuranic Alpha	1500		d/m/g	U	17(16)	180	<10-848	0
Tungsten	200		ppm	235U	17	<70	All <70	0
Uranium	(3)		Percent	Weight	17	67.597	67.57-67.61	-
Uranium Hexafluoride	99.5		Percent	Weight	17	99.972	99.94-99.99	0
Uranium-232	0.110		ppm	235U	17(14)	0.018	<0.003-0.086	0
Uranium-233	500		ppm	235U	17(1)	140	<100-140	0
Uranium-234	(3)		Percent	Weight	17	0.011	0.007-0.016	-
Uranium-235	(3)		Percent	Weight	17	1.5175	0.9362-2.4391	-
Uranium-236	(3)		Percent	Weight	17	0.158	0.017-0.328	-
Vanadium	200		ppm	235U	17	<42	All <42	0

(1) All levels are maximums except UF₆.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-30. Specification Analyses for Cogema (French) Reactor Returns, CY 1973

Measurement	Feed		Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
	Specification Level (1)	Specification						
Antimony	(1)	ppm	U	28	<1.0230	All <1.0230	0	
Boron Equivalent Cross Section	(8)	ppm	U	28(1)	1.9771	<1.8-1.9771	0	
Bromine	250	ppm	U	28	<1.85	All <1.85	0	
Chlorine	1000-110	ppm	U	28	29.0302	9-66.5-10.021	0	
Chromium Hexavalent	1500-2	ppm	U	28(9)	598.039	<300-1200	0	
Cylinder Pressure	75	PSIA	At 200°F	28	52.1907	50-68	0	
Fission Product Gamma	200	Percent of Aged	U	28	<2.34	All <2.34	0	
Fission Product Beta	100	Percent of Aged	U	28	<2.34	All <2.34	0	
Hydrocarbons, etc.	0.01	Percent Mole	U	28	<0.01	All <0.01	0	
Molybdenum	200	ppm	235U	28(3)	68.02	<25-79	0	
Niobium	10	ppm	U	28	<0.2	All <0.2	0	
Nonvolatile Fluorides	300	ppm	U	28	62	10-176	0	
Phosphorus	50	ppm	U	28	<20	All <20	0	
Ruthenium	1	ppm	U	28	<1	All <1	0	
Silicon	100	ppm	U	28(25)	5.0	<2-15	0	
Tantalum	1	ppm	U	28	<0.5	All <0.5	0	
Titanium	1	ppm	U	28(6)	0.65	<0.3-0.9	0	
Transuranic Alpha	1500	d/m/g	U	28(27)	748	<50-7165	2	
Tungsten	200	ppm	235U	28	<62	All <62	0	
Uranium	(3)	Percent Weight	U	28	67.594	67.55-67.61	0	
Uranium Hexafluoride	99.5	Percent Weight	235U	28	99.971	99.90-99.99	0	
Uranium-232	0.110	ppm	235U	28(27)	0.0236	<0.001-0.056	0	
Uranium-233	500	ppm	235U	28	<100	All <100	0	
Uranium-234	(3)	Percent Weight	U	28	0.0146	0.006-0.021	0	
Uranium-235	(3)	Percent Weight	U	28	1.9771	0.7987-4.4951	0	
Uranium-236	(3)	Percent Weight	U	28	0.2420	0.009-0.340	0	
Vanadium	200	ppm	235U	28	<38	All <38	0	

(1) All levels are maximums except UF6.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.

Table A-31. Specification Analyses for Euro-Chem (Belgian) Reactor Returns, CY 1970

Measurement	Feed Specification Level (1)	Units	Basis	Number of Samples (2)	Average	Range	Number Exceeding Specification
Antimony	1	ppm	U	2	<1	All <1	0
Boron Equivalent Cross Section	8	ppm	U	2	0.03	0.01-0.05	0
Bromine	5	ppm	U	2	<1	All <1	0
Chlorine	100	ppm	U	2	22	14-30	0
Chromium	1500	ppm	235U	2	<210	All <210	0
Cylinder Pressure	75	PSIA	At 200°F	2	50	49-51	0
Fission Product Gamma	20	Percent of Aged		2	<5	All <5	0
Fission Product Beta	10	Natural U		2	<2	All <2	0
Hydrocarbons, etc.	0.01	Percent Mole		2	<0.01	All <0.01	0
Molybdenum	200	ppm	235U	2	<21	All <21	0
Niobium	1	ppm	U	2	<0.2	All <0.2	0
Nonvolatile Fluorides	300	ppm	U	2	30.5	12-49	0
Phosphorus	50	ppm	U	2	<20	All <20	0
Ruthenium	1	ppm	U	2	<1	All <1	0
Silicon	100	ppm	U	2	3.5	3-4	0
Tantalum	1	ppm	U	2	<0.5	All <0.5	0
Titanium	1	ppm	U	2	<0.3	All <0.3	0
Transuranic Alpha	1500	d/m/g	U	2	<134	60-207	0
Tungsten	200	ppm	235U	2	<52	All <52	0
Uranium	(3)	Percent Weight		2	67.604	67.603-67.604	0
Uranium Hexafluoride	99.5	Percent Weight		2	99.978	99.978-99.979	0
Uranium-232	0.110	ppm	235U	2	0.0305	0.024-0.037	0
Uranium-233	500	ppm	235U	2	<42	All <42	0
Uranium-234	(3)	Percent Weight		2	0.011	All 0.011	0
Uranium-235	(3)	Percent Weight		2	0.9530	0.9524-0.9582	0
Uranium-236	(3)	Percent Weight		2	0.185	0.18-0.19	0
Vanadium	200	ppm	235U	2	<52	All <52	0

(1) All levels are maximums except UF₆.

(2) The numbers in parentheses reflect the number of analyses in averages. Only quantified results are used in averages, i.e., "less than" results are excluded.

(3) Not a specific specification.